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SOME PHARMACOPŒIAL PROBLEMS.

By Charles Rice.

While each new Pharmacopœia, at the time of its appearance, represents, in a general way, the then existing state of therapeutic and pharmaceutical progress, there is, naturally, no lack of new problems, which continue to present themselves for consideration, not only after the work is issued, but sometimes also while it is still passing through the press. In the case of our own Pharmacopœia, a number of quite serious problems were encountered during the last two revisions, some of which, as, for instance, the admission of "patented" synthetics, were solved by the dictate of the National Convention, while others, such as nomenclature and standardization of all drugs except cinchona and opium, were left to the discretion of the Committee of Revision. The Committee endeavored to solve these problems to the best of its ability, and their decisions and action have, on the whole, met with approval on the part of competent judges. Among the more important problems which confronted the present Committee of Revision was that of emancipating the Pharmacopœia from the control of the publishing trade, and of setting it up on an independent financial basis. This problem may be regarded as definitely solved, and, therefore, may be omitted from consideration here. Disregarding the minor problems which affect the details and minutiæ of the text of the articles contained in the Pharmacopœia, there remain certain subjects which stand out more prominently, and are worthy of general discussion. They are, moreover, of such a nature that they should be definitely

passed upon and settled by the National Convention, so that the next Committee of Revision will be relieved of all responsibility regarding their rejection or adoption. These subjects are not new, and have frequently been written and talked about. But, in the course of time, our knowledge has made material advances, some of our views have undergone changes, certain prejudices may have been abandoned, and conditions in general appear to have so changed that it is perfectly proper to disregard former arguments and deductions, and to consider the subjects anew.

The Pharmacopœia was originally intended to be the official guide both for the physician and the pharmacist. During the earlier period of its existence in this country the physician took a greater interest in, and had, at least officially, a larger share in its preparation or revision than the pharmacist. That this is no longer the case is generally known and acknowledged. While, theoretically, the medical profession has not lost its interest in it, and is well represented at every Decennial Convention, yet, practically, the Pharmacopœia has ceased to be a work of reference for the physician. And why? Chiefly because it does not contain the information which the physician requires regarding the nature, properties and doses of some of the most important remedies he uses. To a large extent he is himself responsible for this condition of things, for he has, very likely, been one of the large group of medical men who opposed the admission into the Pharmacopœia of the very things regarding which he needs information, and for which he must now look elsewhere. Most physicians do not take much interest in botanical or chemical descriptions, or in tests of identity and purity. The main objects which a physician usually has, or would have, for consulting a Pharmacopœia are to ascertain:

(1) What form or forms of administration are officially available in the case of a certain drug?

(2) What is the strength of the respective preparations?

(3) What are the ordinary doses?

Under present circumstances he may find in the book an answer to the first two questions, but, knowing that he will find none to the last-named one, which to him is probably the most important, he simply ignores the Pharmacopœia, and turns at once to sources which he has found by experience to afford the desired information. There is no use whatever in trying to make the Pharmacopœia bet-

ter known to, or "more popular" with, the physician, unless it is made worth his while to consult it. To restore the Pharmacopœia to its former status among medical men is a task which requires their co-operation in this, that the next Committee of Revision may be authorized to give the average *doses* in connection with the several drugs and preparations. It may be taken for granted that the Committee will exercise its best judgment in arranging this part of the text so that no harm can result to either profession.

The pharmacist, particularly at his prescription counter, also often has occasion to look for precisely the same information that the physician wants and, knowing that he would look for it in vain in the Pharmacopœia, he at once consults some other work of reference, preferably one which will give him at the same time all other needed information regarding physical or chemical properties, solubilities, incompatibilities, etc. Is it to be wondered at that the Pharmacopœia is not a "popular" book among pharmacists?

As to the so-called *Newer Remedies*, and more particularly the "patented" synthetics, a curious anomaly may be observed in the position taken with reference to them by many physicians, who in their daily practice freely prescribe such as trional, sulfonal, phenacetin and others, and who treat of them and advocate them in their medical writings and even on the lecture platform, yet who are disinclined to vote for their admission into the Pharmacopœia. This may be regarded as an ethical riddle. If the Pharmacopœia is to be gradually purged of old and useless drugs and preparations, and not to be brought up to date by the introduction of the newer drugs of recognized value used universally by the medical profession, it might just as well remain unrevised and go out of existence. Medical and pharmaceutical schools have for a number of years past found it necessary to supplement the official series of remedies from other text-books. The time might eventually arrive when the Pharmacopœia would cease to be of service even as a text-book in schools. In view of all this it can hardly be doubted that the next Decennial Convention will authorize the new Committee of Revision to introduce into the Pharmacopœia such of the *Newer Remedies*—irrespective of any consideration of patent rights, etc.—as shall be found worthy of a place therein. It will not be very difficult to decide their respective merits, because, if the following conditions are exacted in every case, the number that will deserve consideration will

probably be less than a dozen. The conditions or characteristics that ought to be complied with are the following:

(1) If the remedy is a definite chemical compound, its chemical composition and physical and chemical properties should be known and controllable. (Examples: antipyrine, aristol, chloralamide, phenacetin, salophene, sulfonal, trional.)

(2) It should have passed the experimental period, and should be in regular and general use by the medical profession as a remedy of a definite and recognized therapeutic value.

Statistics as to the regular and general use of any such remedy can readily be obtained from reliable sources, such as the larger dispensing pharmacies, large hospitals, the Government medical service, etc. As to how and under what titles these remedies are to be introduced is of minor importance. This may safely be left to the Committee of Revision.

In former times the Pharmacopœia was a work chiefly concerning itself with what its name expresses, namely, the *making* of medicines. At the present day the name has already become, at least partly, a misnomer, and the time may not be far distant when it should rather be called Pharmaconomia or Pharmacographia, that is, a book *prescriptive* for, or *descriptive* of, medicines. This gradual transition is, however, quite natural, and in normal proportion to the changes that have taken place in the condition and status of the profession of pharmacy. When we consider the exacting demands which are made at the present day, under various laws, upon the quality of medicines dispensed by pharmacists, it is not to be wondered at that the latter become more and more unwilling to assume full responsibility for the quality, and particularly the exact strength, of the preparations they dispense, but that they prefer to shift this responsibility upon the manufacturer, more especially when the latter assures them that he is willing to assume the responsibility himself. This matter of responsibility for the quality of medicines in combination with considerations of economy, particularly by the saving of time, space, labor and wages, has brought it about that the manufacture of certain classes of pharmaceutical preparations is becoming more and more concentrated in the hands of large firms, and that the function of the pharmacist—at least of the conscientious pharmacist—is chiefly confined to an examination of the preparations which he buys by means of such tests as are available to him.

Recognizing these conditions, modern pharmacopœias have, at each new revision, eliminated working processes for preparations which were known to have passed almost entirely into the large manufacturer's hands, and have substituted for them more detailed descriptions and tests. Among the tests, those which are intended to show the strength of the preparations by gravimetric or volumetric assays have been made more and more rigorous, and their application has been extended to drugs and preparations which formerly were not subject to strict regulations. The progress made in organic proximate analysis, notably during the past fifteen years, brought forth a demand for the *standardization* of the preparations of potent drugs, often, unfortunately, on the part of persons who were not sufficiently familiar with the technical difficulties that stood in the way of a more general application of the then known methods of assay. In 1890 the present Committee of Revision was directed to give processes of assay for two drugs only, namely, cinchona and opium, it being left at liberty to extend standardization to others. By the time the Committee was ready to go to press, only one more drug, viz., nux vomica, was added to the list, it being deemed unwise to proceed further at that time. Since then, however, a very material advance has been made in the methods of proximate analysis, and there is every reason to hope that processes of assay can be provided at the next revision for such drugs as belladonna, coca, colchicum, gelsemium, hyoscyamus, ipecac, physostigma, pilocarpus, stramonium, and perhaps some others.

The term "standardization" as applied to pharmacopœial preparations comprises three distinct features, which are not seldom confounded, and one of which is commonly overlooked. They are as follows:

(1) *Quantitative Determination of the Active Principles.*—The quantity of the active principle (or principles, as the case may be) in the drug or preparations to be standardized must be determinable by a fairly simple process yielding practically uniform results in different hands.

(2) *Identification of the Active Principle.*—It should be possible to identify the active principle by some fairly simple process. This applies, of course, only to preparations not made directly from the original drug, but purchased ready-made in the market, possibly of unknown or doubtful brand or origin. This is the feature which is

often overlooked. It is manifestly insufficient merely to determine the amount of alkaloidal or other active substance present, particularly in the case of preparations made from expensive drugs, unless it is shown that the separated principle is unaccompanied by matters foreign to the drug, such, for instance, as some cheap foreign alkaloid that might have been added to bring out a favorable "assay." While this feature (the identification) is quite important in actual practice, it can be disregarded in the Pharmacopœia, since the latter generally directs to start a preparation from the drug itself, about the identity of which there can be no question.

(3) *Adjustment of Strength.*—This is the final end and aim of "standardization." It is, of course, comparatively easy to standardize the preparations of any drug, the active principle (or principles) of which can be correctly determined quantitatively. It will merely be necessary to agree upon some definite strength or upon an upper and lower limit of the active principles. Of course, standardization need be applied only to drugs of importance and potency. There is no need of standardizing preparations of gentian, quassia, sarsaparilla, squill, senna, etc., even if it were possible in each case to do this.

But there are some drugs which, with our present knowledge, it is not possible to standardize in the sense above mentioned. One of these is *Ergot.* It is claimed by some that its physiological action is due to Keller's "cornutine," and some manufacturers assay it and standardize it on the basis of this alkaloid. But it is not by any means certain that other principles in ergot do not participate in its peculiar action. Another case in point is *Digitalis.* We know that digitoxin is the most active of the cardiac principles it contains. But there is no certainty as yet that it is the only one that should be considered. If we knew for certain that the proportion of digitoxin to the other principles present in digitalis were at all times the same, we could accept it as a measure to gauge the activity of digitalis by. But even this point is not cleared up. And our experience with other drugs makes it likely that the proportion between the various principles of digitalis varies more or less at different times. *Strophanthus* may be mentioned as another drug for which we have no practical assay process. Realizing these facts, and yet desiring to give to their customers reliable preparations, some of the larger manufacturing houses have adopted the

plan of testing these and certain other drugs "physiologically." This is a quite laudable undertaking, and we have no reason to doubt that it is actually carried out. The method of testing employed by one of these houses has been published, but we have no knowledge as to the methods used by the others. It is safe to infer, however, that, as long as a *uniform* method of physiological testing (for each separate drug requiring it) has not been agreed upon, the products of the different houses will turn out to be uniform only by accident. It would be interesting to ascertain what results would be obtained by the several "standardizers," acting independently of each other, from samples of one and the same lot of a preparation, say of ergot, submitted to them without information as to the origin, age, or mode of preparation. Under present conditions it seems hardly probable that their results would agree. Who, then, shall standardize the standardizers? This is a problem for which a solution is sought but not readily found.

But whenever the medical profession will be able to offer methods of physiological testing which will show both the *quality* and the *quantity* of effect, and which are *accepted by a majority of competent judges*, then such tests may well be introduced into the Pharmacopœia, even if they should involve special skill and knowledge not possessed by the average pharmacist at the present time. By the time when such tests will have been brought forward and proven practically reliable, the conditions will probably have so changed that nearly all users of the Pharmacopœia will be able to apply them, or else such tests will have to be made only upon wholesale lots by some experts of acknowledged skill and reputation, whose verdict or certificate will be generally accepted. If physiological tests are to be applied to such drugs at all, it would manifestly be a waste of time, labor and valuable material for the pharmacist working on a small scale to test each separate small lot of a preparation when it is finished. He will find it much more advantageous to purchase either the drug itself or the respective preparation, already tested and "standardized" by some recognized expert assuming full responsibility for its standard. Although this standard will, no doubt, be affected by the "personal" error of the expert (until a method is discovered which will exclude or neutralize this error), yet the results will be comparable among themselves, and thus a practical uniformity attained. This shifting of the responsibility

back on the manufacturer would, in these particular cases, not be an evil to be regretted, but a positive gain, as it seems to be the only way by which a practical uniformity in such variable drugs as are mentioned above can be brought about.

To sum up, the writer offers the following recommendations:

(1) That the next Committee of Revision be authorized to introduce Doses into the Pharmacopœia (details to be left to the Committee).

(2) That the Committee be authorized to introduce such of the Newer Remedies as fulfil the conditions above mentioned.

(3) That the Committee be instructed to extend the principle of standardization to as many of the potent drugs, and preparations made from them, as may be found possible, but that no physiological tests be introduced at the next revision.

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THE ANALYSIS OF ESSENTIAL OILS.

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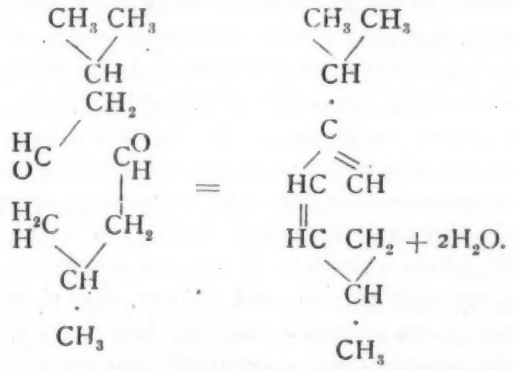
The systematic analysis of essential oils is one of the youngest branches of organic chemistry. It is true that a number of the constituents of these oils have attracted the attention of chemists at a very early date, especially such as crystallize out from the oils on standing in the cold, like camphor, anethol, menthol and others, or such with a pronounced chemical function, like eugenol (then called eugenic acid, on account of its being combinable with alkali); but proper systematic researches in this interesting group of natural bodies were not possible before the excellent investigations of Wallach, Semmler, Tieman and others had furnished the clew for the separation and identification of the component parts of these peculiar substances. It is, however, still to-day impossible—and will, perhaps, in consequence of the complication and the peculiar nature of a great part of the substances in question, ever be so—to isolate, qualitatively and quantitatively, all the constituents of an essential oil by following a fixed scheme like that which has been worked out for an organic analysis, be it only for the reason that the list of bodies occurring in essential oils is still far from being complete, and that every new investigation may result in the detection of

hitherto unobserved compounds. It is even safe to say that not a single oil has yet been analyzed so thoroughly that, by further work, no new facts regarding the same could be detected, even if, as in the case of oil of peppermint, the sum of known constituents runs up to seventeen. There are still a great number of unsettled problems about essential oils towards the solution of which scarcely the first steps have been made, as, for instance: how far does the composition of the essential oil vary in the different parts of the same plant? How is it influenced by the conditions of soil, climate and cultivation? What is the variation in oils from the successive stages of vegetation of the plant? and at length, in what way, by what chemical processes does the plant produce all these so manifold compounds? Is each single one formed in a separate process, or do several or all constituents of an oil stand in genetic connection, being formed successively in one process? There are many indications for such a connection. Perhaps nobody will doubt that it exists between terpenes and terpene alcohols so often associated in essential oils; but the question is, are the terpenes formed from terpene alcohols by splitting off water, or the latter from the former by hydratation? The frequent occurrence of small quantities of the lower aldehydes, like acetic and iso-valerianic aldehyde, and ketones in the oils seems to indicate that these bodies, which are so susceptible to condense with formation of unsaturated compounds of considerable complication, play an important role in the building up of various constituents of the oils; so, for instance, it seems possible that i-valeraldehyde might form terpenes:



But so far it has been impossible to effect any such or similar con-

densation by the means of the laboratory. Furthermore, it is a peculiar coincidence that, as a cursory review of the known constituents of essential oils shows, no less than 55 per cent. of those constituents possess ten carbon atoms in their molecules, while those with five and fifteen carbon atoms amount to further 15 per cent., and the entire remainder is only 30 per cent.; hereby those with ten atoms possess such a heterogeneous composition as terpenes, terpene alcohols and their aldehydes, menthol, camphor, thujone, pulegone, fenchone, cineol, carvol, carvacrol, anethol, eugenol, safrol, etc. It can hardly be assumed that this is a mere incident, but, though I do not think that nature itself believes in the decimal system, this fact seems to indicate a connection between the various processes by which these bodies are generated. Be this as it may, these few points just mentioned are sufficient to show how many problems of the chemistry of essential oils still are awaiting their solution, which probably will be greatly promoted by a careful and critical study of the constituents of a great number of essential oils, and that, therefore, still for a long time the study of these questions will afford an interesting and fruitful field for the efforts of chemists.

It is true, however, that such a study does not belong to the easiest tasks of analytical chemistry, and it is, therefore, necessary that the chemist who undertakes it first become thoroughly acquainted with the peculiar character of the respective compounds, if he wants to avoid the most fatal errors in his results. The overwhelming majority of these compounds contain so-called double bonds, and therewith possess, as thermochemical researches have shown, an excess of energy, in comparison to saturated bodies, which confers upon them the tendency to get transformed, under partial liberation of this excess of energy, into other more stable compounds. These circumstances account for the great inconstancy of many of the essential oils. Even at ordinary temperature resinification gradually sets in; oxygen is reabsorbed, at first with formation of ozone or bodies of super-oxyde-like character which further on effect oxidations, by which the whole character of the oil is changed; it loses its fragrance, becomes thicker and heavier, and more soluble in diluted alcohol, shows increased acid and acetylization figures, etc. But even if the access of air is excluded, changes will take place especially under the influence of light; double bonds migrate, poly-

merization sets in, with increase of the specific gravity and decrease of the solubility, etc. Much quicker such changes will occur under the action of heat or of chemical reagents, and it therefore cannot surprise that in investigations of the components of essential oils, in which the use of heat and of chemicals cannot be avoided, often bodies are found finally which are quite different from those originally present in the plants. If the bodies into which an oil has been separated by an investigator are mixed again, the mixture will usually be quite different from the original oil, a sure proof that certain constituents have undergone changes during their isolation. There is even some doubt if the oil which is used for an investigation is really identical with the one originally present in the plant, or if it has not already undergone changes by the distillation with steam, the process generally used for the production of essential oils. That such changes actually occur is shown by the fact that every improvement in the technical preparation of the essential oils is accompanied not only by an increase of the yield, but also by an alteration of the properties of the oil. For example: when by the use of an improved distilling method, the time required for the distillation of cloves was reduced to about one-half, not only a higher yield resulted, but the oil also showed a finer fragrance and a materially decreased specific gravity, even considerably below the limits required by the U.S.P., so that for the latter purpose not the natural, but only fractionated distillates were available. Evidently by the former more imperfect process a part of the oil, apparently just substances of the finest aroma, had been resinified to much less volatile bodies and were thus lost. Upon this circumstance is based one of the difficulties to fix definite requirements for the properties of essential oils, as these properties largely depend not only on the variable crude materials which have furnished the oils, but also on the process by which the oils are obtained. If, for instance, as it has really been the case, a chemist obtains in his laboratory from cloves 7 per cent. of oil, while the improved technical distillation furnishes about 18 per cent., it is evidently an absurdity to proclaim the laboratory distillate as a standard for clove oil, because it consists only of the more volatile, respectively the more stable parts. This inconstancy of the composition of essential oils renders it recommendable to characterize an oil intended for analysis as completely as possible, so that, in case of different findings by other investigators,

the reason of such differences can be accounted for. It is therefore desirable to state: (1) Genus and species of the plant which furnished the material; (2) what parts of the plants have furnished the oil; (3) in what stage of growth, respectively at what time was the material collected; (4) how was the distillation effected (on dry or fresh material, after fermentation or not, with water or with steam, etc.); (5) how and how long had the oil been kept between preparation and analysis; (6) specific gravity; (7) optical rotation, refraction and dispersion; (8) solubility in alcohol of various strength; (9) saponification and esterification numbers. Some of these data furnish indications which will greatly facilitate the identification of the bodies resulting from subsequent fractionation. So, for instance, a specific gravity below 0·84 indicates the presence of large quantities of aliphatic compounds, like methyl-nonylketone in oil of rue, hexyl- and ethyl-alcohol and their esters in oil of heracleum. A specific gravity above 0·9 betrays the presence of oxygenated compounds, above 1·0, that of aromatic bodies, etc. Insolubility in 70 or 80 per cent. alcohol indicates hydrocarbons; insolubility in larger quantities of 90 per cent. alcohol, paraffines, sesqui- and polyterpenes. From the saponification figure before and after acetylization the amount of esters, lactones and alcoholic bodies may be estimated.

After this preliminary work, we may proceed to the proper analysis of the oil. It is, however, a useful rule never to use the whole of the oil at command for this analysis, but to reserve a good deal of the same, both for later reference or for the case, occurring even at the most careful work, that some fractions are lost by accident or decomposition from improper treatment. All processes to which the oil is subjected should first be tried with a small quantity, and only if the treatment is successful and results in the isolation of the supposed compound, the bulk of the oil should be subjected to the same process.

It has already been said that it is impossible to construct a general scheme for the analysis which would in all cases lead to the detection of all the constituents of the oil, and the result therefore largely depends on the practical experience, the skill and the divinatory faculties of the chemist. As most of the components of essential oils possess a more or less pronounced odor, it is especially the sense of smell which greatly facilitates such kind of work, the more so, the better it has been developed by proper training.

There exist, however, besides this, some general points of view after which such an investigation can be conducted, and which we now come to describe.

As the overwhelming majority of essential oils have at ordinary temperature the liquid form, the most important process for their analytical treatment is fractional distillation. Useful and indispensable as the same may be, it is at the same time a very slow and imperfect process, and every other known method which leads to the removal of one or the other constituent should be made use of.

Many oils contain bodies which are solid at ordinary or lower temperatures, and will crystallize from the oil when it is exposed to cold. As such a treatment is not liable to effect decomposition, this method, if serviceable at all, should never be neglected. Often prolonged exposure to the cold of a good freezing mixture is required, with repeated stirring by means of a sharp glass rod. If the odor indicates the presence of a known crystallizable body, the crystallization will be accelerated by the addition of a minute fragment of that body. In this way crystals of borneol, menthol, safrol, anethol, apiol, etc., are obtainable, which are then separated from the liquid by a well-cooled filter or centrifugal machine. Naturally such a separation is never complete, and we always have to take regard to the dissolved parts during the further processes.

Hereafter, a sample of the oil is tested for the presence of aldehydes and some, especially methylic ketones, which are combinable with sodium bisulphite, and can thereby be isolated from the oil. This also should never be neglected, as many of these bodies will not stand the subsequent boiling with alkali, but are decomposed with formation of acid and alcoholic compounds, and would therefore falsify the result about the presence of acids and esters. The shaking with bisulphite solution must be continued for a considerable length of time, as some bisulphite compounds are formed very slowly (thujone for instance requires several days); addition of some alcohol often accelerates the reaction. Further attention is called to the property of some unsaturated aldehydes, like citral, citronellal, cinnamic aldehyde, to form solid bisulphite compounds which, upon standing, will combine with a second molecule of bisulphite, under formation of liquid compounds which sometimes cannot again be decomposed into their components; such bodies are therefore treated according to the rules given in the corresponding literature.

Some ketones and aldehydes, like acetone, acetic aldehyde, vanillin, yield, from the beginning, very soluble bisulphite compounds, which usually do not crystallize out; the aqueous solution should, therefore, by boiling with soda or sulphuric acid, always be tested for the presence of such soluble compounds; in the same way the aldehydes or ketones can usually be obtained from the solid bisulphite compounds.

Occasionally the latter form very disagreeable gelatinous masses, which are almost unfilterable; upon prolonged standing, with occasional shaking they usually are obtained in the crystalline state; also here the addition of some alcohol is often useful.

Now we proceed to the removal of acids and phenols by treatment with a caustic potash or soda solution. A very common mistake is here made in that an excess of concentrated alkali is used. This is quite unsuitable, because the alkali salts of the higher fatty and many other acids, also the alkali compounds of the phenols, are only little soluble in an excess of stronger alkali and will therefore either crystallize in masses which form very annoying emulsions, or will chiefly remain dissolved in the oil. Moreover, strong solutions of phenol-alkalies dissolve large quantities of many other compounds, even hydrocarbons, so that, for instance, oil of bay, which contains about 60 per cent. of eugenol and 40 per cent. of a hydrocarbon, will, with the proper quantity of a strong aqueous solution of caustic soda, yield a perfectly clear mixture, from which the hydrocarbons will only separate after the addition of much water. Therefore, only a 3 to 5 per cent. solution of alkali should be used and the oil extracted successively with small quantities of the latter, till a sample of the watery layer no longer becomes turbid upon acidifying. Even in such dilution the phenol-alkalies still dissolve notable quantities of indifferent substances; their solution must therefore first be extracted with ether, which, in its turn, even in presence of an excess of alkali, dissolves some phenol (so it is, for example, possible to extract from an alkaline solution of carvacrol, by often repeated treatment with ether, practically all of the phenol); this phenol must be extracted from the ether by renewed treatment with alkali. This alternate extraction has to be repeated several times to effect a fairly complete separation of the phenols.

If esters of phenol acids are present, they will likewise form unstable alkali compounds; that of methyl salicylate with soda forms

a white almost insoluble mass which is gradually saponified to sodium salicylate and methyl alcohol on heating, while the corresponding potassium compound is very soluble in water; upon acidulation of the fresh solution it forms again methyl salicylate, while upon standing of the solution the ester-salt becomes likewise saponified.

The alkali salts of the higher fatty acids, like lauric, myristic and palmitic acid, remain, at the alkali treatment, partly dissolved in the oil, and are later found in the residue from the steam rectification.

The purified alkaline solution is then acidulated with dilute sulphuric acid, whereby phenols and less soluble acids and phenols form an oily layer or crystalline masses; that part which remains in solution is obtained by extraction with ether or distillation with steam.

The mixture of acids and phenols can be separated by shaking their ethereal solution with a solution of sodium bicarbonate, which takes up only the acids, while sodium carbonate would also dissolve some phenols, like eugenol, etc.

The phenols which remain after evaporation of the ether can then be separated by fractional distillation and identified by their usually well crystallizing benzoates (prepared after Schotten-Baumann's method) or by the aldehydes and acids which result from the oxidation of their acetates or benzoates.

Solid acids are separated by methodic crystallization from suitable solvents; from liquid acids the dry alkali salts are prepared, these latter being then transformed into esters by boiling with alcohol and sulphuric acid; the resulting esters are then fractionated. The fractions of constant boiling point are hereafter saponified, then the silver salts prepared from the neutral solutions and analyzed by combustion.

In many oils which contain bodies with hydroxyl groups (alcohols and phenols), part of these latter are present as esters, chiefly esters of acetic acid; but also butyric, valerianic, benzoic, cinnamylic and other esters are found occasionally. To the groups of esters, in their chemical behavior being quite similar to them, the lactones may be counted, which are quasi inner esters, the carboxylic and hydroxylic groups which have combined under formation of water belonging to the same molecule. To test an oil for the

presence of esters and lactones, about 5 grammes of the oil are boiled for an hour in a reflux condenser with 50 c.c. of a semi-normal solution of alcoholic alkali; subsequent titration with standardized sulphuric acid shows if hereby alkali has been neutralized. In the case of a positive result it is almost indispensable to saponify the whole oil before proceeding any farther, because some esters, like those of linalool, geraniol or terpineol, will not stand higher temperatures without being split, more or less, into terpenes and acids, the latter then effecting further chemical changes, isomerizing and resinifying terpenes, splitting off water from terpene alcohols and so on. It must, however, not be forgotten that by a prolonged action of alcoholic alkali in the heat, also some constituents without acid character are liable to undergo changes; linalool is partly destroyed with formation of acids, allyl groups are isomerized to propenyl groups (thus, for instance, safrol, methyl chavicol, apiol form the corresponding iso- compounds). The amount of alkali to be used should, therefore, be calculated from the result of the previous quantitative experiment, and any considerable excess carefully avoided. Heating on the water-bath for about half an hour will generally be found sufficient for a complete saponification. The alcohol is hereafter distilled off on the water-bath and the rest still remaining in the oil blown out with steam. From the distillate some of the more volatile parts of the oil are obtainable by rectification and washing with water.

The aqueous solution from the saponification (which should still be slightly alkaline) is then separated from the oil, the latter washed with water and the combined watery liquids which, especially when containing phenols, still hold some oil in solution, extracted with ether or distilled with steam. The remaining solution then contains the alkali salts of acids and phenols, also those of oxyacids, if lactones had been present.

To separate these groups, an excess of dilute sulphuric acid is added and the mixture boiled for some time in a reflux condenser, whereby the oxyacids again form lactones. After cooling, the whole is extracted with ether; the ethereal solution then gives off its phenols and acids when shaken with cold diluted caustic alkali, while the lactones remain behind on evaporating the ether. Phenols and acids are then separated according to the rules given above.

Now the number of group reactions, which lead to the separation

of special classes of compounds, is practically exhausted, and for further separation we have to resort to fractional distillation. As nearly all crude oils, however, contain some resinous matter, part of which may also have been formed by the foregoing treatment, it is better, before further fractionation, to rectify the remaining oil with steam. By this process we obtain a much more complete separation of the resin than by direct distillation, and we also avoid unnecessary overheating of the oil and formation of decomposition products; moreover, a crude fractionation of the oil is effected by collecting the subsequent distillates separately. The oil, which remains dissolved in the water, is recovered by cohobation. A careful examination of the residue from the steam distillation should not be neglected, as, besides undefinable resins, it may contain the alkali salts of higher fatty acids, which were not extracted by water at the removal of acids and phenols; also some other bodies of high boiling point, like paraffines, which have been blown over by the powerful steam currents of the chemical industry, but which resist the volatilizing power of the steam in a laboratory flask.

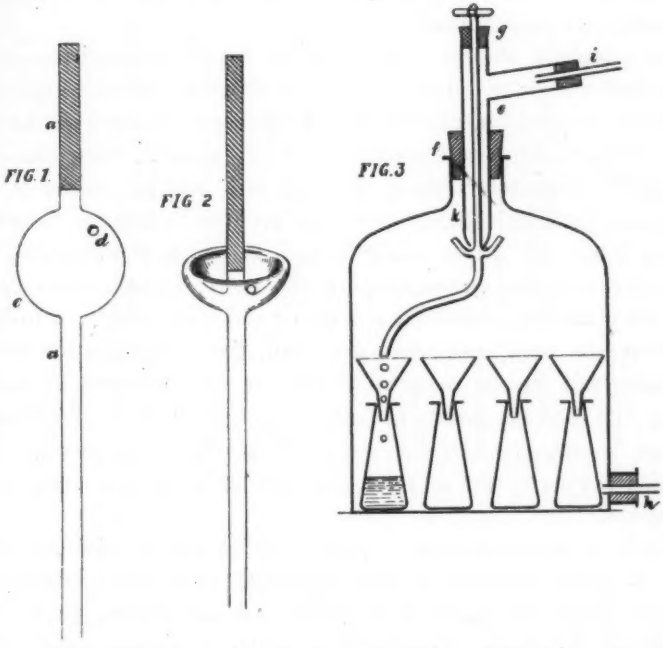
Now we proceed to fractional distillation. Invaluable as this method may be to the chemist, it is nearly always a slow and tiresome process, the efficiency of which is often overrated. Any one who stands for the first time before the task to separate, somewhat quantitatively, even only two bodies with a difference of, let us say, 15° in their boiling points, will probably be badly disappointed to notice how many times the fractionation has to be repeated, until the desired result is approximately obtained; and if he has once completed the task of thoroughly separating the constituents of such complex mixtures as essential oils usually are, and seen how many delusions he undergoes from fractionation to fractionation regarding the range of temperature in which the chemical individuals which are present are likely to boil, how often the main fractions are first collected at temperatures in the neighborhood of which, finally, nothing is present at all—any such one will only have an amused smile for the harmlessness with which sometimes even in chemical journals a judgment is passed upon the composition of an essential oil, merely from the result of one or two fractionations.

If the facilities of a laboratory render it possible, the fractionation of an essential oil should be performed as much as possible under reduced pressure. A vacuum of about 15 millimetres, which is

easily obtained by a good water jet pump, is the most recommendable arrangement, but also a pump of minor efficiency will render good service. Especially in the beginning of the fractionation the temperature of the boiling liquid is, in consequence of the presence of bodies of higher boiling point, so much higher than the true boiling point of the more volatile parts of the distillate, that the latter are very apt to undergo changes from overheating, even if in their pure state they are distillable without decomposition under ordinary pressure. Thus, for instance, it is sometimes impossible, with oils that give a strong phellandrene reaction, to find this hydrocarbon in any part of the distillate after some fractionating under ordinary pressure; it has completely disappeared by isomerization. Under the same condition pinene will partly be transformed into dipentene, myrcene will for the greater part be polymerized to diterpenes, which boil under decomposition only at a very high temperature, etc. In spite of the evident great advantages of the vacuum distillation, it is not used in the laboratory as much as it deserves, because many chemists consider the taking of fractions under a vacuum very incommodious, on account of the interruption of the vacuum, though many forms of apparatus have been constructed which allow to change the receiver without such an interruption. It is, however, true that many of these constructions are either expensive or inconvenient, as they are very apt to break, difficult to be kept airtight, or provided with glass cocks which refuse to turn and rubber connections which stick fast or get dissolved by the vapors. It might, therefore, perhaps, not be useless here to describe an apparatus which I have had in use over twelve years and the construction of which is so simple that it can be made by any one with a little skill in glass blowing, from materials which are found in every laboratory; the apparatus is likewise so handy that it can be used to advantage even for fractionation under ordinary pressure.

An ordinary glass tube (*a*, *Fig. 1*) and a good round glass rod (*b*), both about the thickness of a pencil, are soldered together, and a bulb (*c*) blown out from the former, about 1 inch in diameter, and the latter provided with a hole (*d*). Now the upper half of the bulb is heated before the gas blast until soft and then forced down, so that a kind of double-walled cup, with a hole in the bottom of the inner wall, is formed (*Fig. 2*). Now we insert a glass tee (*e*) (about ½ to ¾ inch) into the upper tube of an ordinary bitubular

exsiccator, by means of a good rubber cork (*f*), in the way shown (on a smaller scale) in *Fig. 3*, and into the tee the cup-piece before described, by means of a cork (*g*) saturated with paraffine and smoothly bored, after the lower end of the cup-piece has been suitably bent. The lower end of the tee, which reaches into the cup, is somewhat tapering, so that a small annular space is formed around the inner tube. The upper end of the glass rod is provided with some handle, which is made detachable, so that the glass rod can be pulled through the cork when the cup-piece needs cleaning. The use of the appa-



ratus is self-evident: after it has been evacuated through tube *h*, the distilling liquid enters through *i*, flows through the annular space into the cup and through the hole in the bottom of the latter, and subsequently through the bent tube into one of the receiving flasks, which have been placed in a circle on the glass plate of the exsiccator. The tee is, in the interior of the latter, on the side opposite from the inlet, suitably provided with a small hole (*k*), through which air entering with the distillate can escape, so that spattering out of the cup is avoided. To take a new fraction, all

that is necessary is to turn the upper handle till the liquid drops into the next receiver. The only piece of this apparatus that has to be moved during the operation is the glass rod in the cork, which always will turn easy and hardly ever leak.

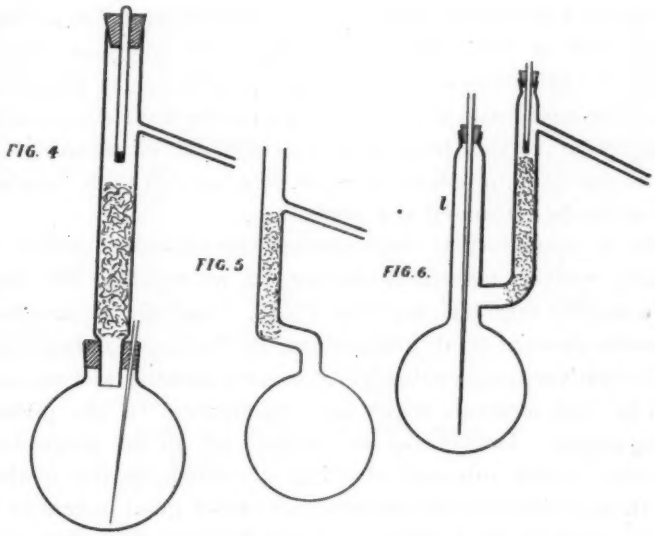
To regulate the vacuum if the water pressure should vary, a tee can be connected with *h*, one outlet of which leads to the pump and the other one, by means of a thick rubber tube, to a filter flask with lateral tube, which is also mounted with a rubber tube; by squeezing both rubber tubes more or less with adjustable pinch-cocks, any constant air pressure within the range of efficiency of the pump can be produced.

Due attention should also be given to the correctness of the thermometers, which often are all but accurate when bought from the dealer, and which, moreover, will undergo changes of the scale when used for high temperatures. They should, therefore, often be controlled by determining melting and boiling points of pure substances for which these figures are accurately known. The most suitable kinds are those made from Jena glass, recognizable by a lengthwise red line on the back of the stem; for all ordinary purposes they can be considered as correct and unvarying. If ordinary thermometers with long stems are used, the correction for the part not immersed in the vapors should not be neglected, at least for stating the boiling points of pure substances; such a correction becomes unnecessary by the use of short thermometers the scale of which begins at 60° or 100°, and can be immersed entirely into the vapors.

In order to accelerate the separation of liquids of different boiling points, a great number of dephlegmators have been constructed, many of which are quite serviceable, but sometimes apt to break or difficult to clean. Generally, I prefer a simple tube (*Fig. 4*), about ¾ inch wide, longer for low-boiling and shorter for high-boiling substances; near the upper end it has a lateral discharge-tube, near the lower end it is narrower, so as to offer a rest for some pieces of broken glass; upon these smaller fragments of glass, or short pieces of thin glass, tubes are filled, nearly up to the lateral overflow. For high-boiling liquids ordinary fractionation flasks are used, which are provided with an offset before the gas blast; the space between the latter and the lateral tube is again filled with broken glass (*Fig. 5*). For fractionation in the vacuum, when the

use of a capillary tube is indispensable, to prevent bumping, the form *Fig. 6* of flasks is very convenient; the tube *l* takes up the capillary. These flasks are an article of commerce.

To avoid overheating of the liquid and to secure a very even distillation, the use of a bath instead of the heating with free flame is recommended. A bath of any fatty oil, or of liquid paraffine, will generally be serviceable; more convenient, however, because of not being inflammable and not giving off any offensive vapors at high temperatures, is a bath from Wood's metal, which melts at about 60° C.; it is true that the first cost is somewhat high, but it will last a lifetime.



A very common fault of beginners is, to take from the start fractions within very narrow intervals of temperature, in the opinion thus to effect a quicker fractionation. Soon they then have such a large number of small fractions that the indications of the thermometer become quite uncertain because the rise in distillation temperature of the successive fraction is so fast that an exact reading off is impossible. Such a proceeding also appears to be quite misleading, if we consider the very imperfect separation during the first fractionations. It is much better first to divide the whole oil into four or five about equal fractions, without

much regard to their boiling points. The latter may be, for instance, 170°–185°, 185°–210°, 210°–240°, 240°–280°. Now we start again with the first fraction. It will begin to boil below 170°, say at 160°; nevertheless we take again a fraction to 185°. At this temperature the flask will, at all events, still contain quite some liquid; we now add fraction 185°–210°. On starting again, we are sure to find a lower boiling point than 185°, may be 175°; that which passes over between 175° and 185° is added to fraction 160°–185°. Now we take fraction 185°–210°, add to the residue fraction 210°–240°, and so on. In this way we obtain again only four fractions, but probably already in proportions rather different from those of the first distillation. It is quite safe to repeat fractionation within the same intervals for a third time. If certain fractions become specially strong, perhaps that of 160°–185°, we divide it into fractions 160°–172°, and 172°–185°, otherwise the work is continued as above, always adding the next fraction to the residue in the flask when the lowest boiling point of this fraction is reached. It is recommended to keep all fractions in bottles of equal size, so that their relative proportion can be estimated at a glance.

Only if, upon further fractionation, the relative quantity of the fractions remains materially unchanged, we separate the distillates within smaller intervals, say from 5°–5°. Gradually it then becomes noticeable about at what temperatures the boiling points of the individual constituent can probably be assumed, and the fractions are then taken in such intervals which are symmetrical to the presumable boiling points. In this way we proceed till all the single fractions pass over within intervals of 2° or 3°, which usually is the case after about a dozen fractionations. A rather good indication that a fraction consists of a fairly uniform body is that the distilling temperature becomes practically independent from the speed of distillation. In mixtures, a relatively greater part of the higher boiling bodies is run back by the dephlegmator at a slow rate of distillation rather than at a high one, therefore in the first case the vapors which pass over will have a lower temperature than in the latter, while, of course, with a body of uniform composition the distilling temperature remains unchanged at different speeds. To push fractionation much farther than to fractions within 2° or 3° is generally unnecessary, in the first line because, as it is evident for theoretical reasons, perfectly pure compounds cannot be obtained

by mere fractional distillation, and furthermore, because then the fractions are sufficiently pure to render their identification by other processes possible. To describe these processes would be quite beyond the limit of this essay; that which is required for the purpose is a careful study of the corresponding literature. I restrict myself here to giving a review over the more frequently occurring constituents of essential oils, arranged according to their boiling points under ordinary pressure, together with those of their derivatives which are advantageously used for their identification.

Boiling Point.		Melting Point.
21°	*Acetaldehyd*	—
	Aldehyde resin	—
56·5°	*Acetone*	—
92°	*i-Valeraldehyde*	—
	i-Valerianic acid	—
146°	*Styrol*	—
	Styroldibromid	74°–74·5°
151°	*Methylamylketone*	—
	(Oxidation with Cr_2O_3)	—
155°–156°	*Pinene*	—
	Nitrosopinene	132°
	Nitrolpiperidin	118°–119°
	Nitrolbenzylamin	122°–123°
154°–156°	*Fenchene*	—
	i-Fenchylalcohol	61·5°– 62°
	i-Fenchylurethane	106°–107°
158·5°–161°	*Camphene*	48°– 54°
	i-Borneol	212°
161°	*Furfurol*	—
	Color with aniline and acetic acid	—
	Pyromucic acid	132°–133°
167°	*Myrcene*, $d_{15} = 0{\cdot}8023$ $n_D = 1{\cdot}4673$	
170°–171°	*Methylheptenone*	—
	Semicarbazone	136°–138°
171°–172°	*Phellandrene*	—
	Nitrite	105°
173°–176°	*p-Cymol*	—
	p-Oxy-i-propylbenzoic acid	155°–156°
	p-i-propenylbenzoic acid	255°–260°
175°–176°	*Limonene*	—
	Tetrabromide	104·5°
175°–176°	*Dipentene*	—
	Tetrabromid	124°–125°
175°–177°	*Sylvestrene*	—
	Benzylnitrolamin	71°– 72°
	Dichlorhydrate	72°

Boiling Point.		Melting Point.
176°–177°	*Cineol*	—
	Hydrobromid	56°– 57°
	Iodol compound	112°
	Cineolic acid	196°–197°
178°–180°	*Terpinene*	—
	Nitrosit	155°
	Nitrolpiperidin	153°–154°
	Nitrolbenzylamin	137°
178°	*Benzaldehyde*	—
	Benzoic acid	120°
192°–193°	*Fenchone*	—
	Oxime	164°–165°
196°	*Salicylic aldehyde*	—
	Disalicylic aldehyde	130°
197°–199°	*Linalool*	—
	Oxyd. to citral	—
203°	*Thujone*	—
	Oxime	54°– 55°
	Tribromid	121°–122°
205°–208°	*Citronellal*	—
	Semicarbazone	84°
	Citronellyl-β-naphtocinchonic acid	225°
206°	*Benzylalcohol*	—
	Phenylurethane	77°– 79°
207°–208°	*Menthone*	—
	Oxime	59°
	Semicarbazone	184°
208°–209	*Sabinol*	—
	Tanacetogendicarbonic acid	140°
209°	*Camphor*	176°–177°
	Oxime	118°–119°
212°	*Borneol*	203°–204°
	Phenylurethane	138°–139°
215°	*Menthol*	—
	Phenylurethane	111°–112°
215°–216°	*Methylchavicol*	—
	Homoanisic acid	86°
	Isomerization to anethol	—
217°–218°	*Terpineol*	—
	Phenylurethane	113°
	Nitrosochlorid	112°–113°
	Nitrolanilin	155°–156°
222°–223°	*Pulegone*	—
	Oxime	118°–119°
	Semicarbazone	172°

Boiling Point		Melting Point.
223°–224°	*Caroone*	—
	Oxime (opt. act.)	72°
	Oxime (racem.)	93°
	Phenylhydrazone	109°–110°
224°	*Methylnonylkelone*	15°
225°–226°	*Citronellol*	—
	Oxyd. to citronellal	—
228°–229°	*Citral*	—
	Citryl-β-naphtocinchoninic acid	197°–200°
	Citralidencyanacetic acid	122°
230°	*Geraniol*	—
	Calciumchloride compound	—
	Diphenylurethane	82°
233°	*Anethol*	21°
	Anisic acid	184°
233°	*Thymol*	50°– 51°
233°	*Safrol*	11°
	Heliotropin	35°– 36°
	Piperonylic acid	228°
235°–236°	*Carvacrol*	—
	Phenylurethane	140°
237°	*Chavicol*	—
	Methylation to methylchavicol	—
237°	*Cuminic aldehyde*	—
	Cuminic acid	115°
248°	*Anisic aldehyde*	—
	Anisic acid	184°
248°–249°	*Methyleugenol*	—
	Tribromid	78°
	Veratric acid	179°–180°
250°	*Cinnamic alcohol*	33°
	Oxyd. to benzaldehyde and benzoic acid	—
251°	*Peppermint lactone*	23°
	Oxyacid	93°
252°	*Eugenol*	—
	Benzoate	69°– 70°
258°–260°	*Caryophyllene*	—
	Hydrate	94°– 96°
	Phenylurethane	136°–137°
274°–275°	*Cadinene*	—
	Dichlorhydrate	117°–118°
	Dibromhydrate	124°–125°
282°	*Cedrol*	74°
285°	*Dill-apiol*	—
	Bibromide	110°
	Dill-iso-apiol	44°
294°	*Parsley-apiol*	29°
	Iso-apiol	55°– 56°
290°–300°	*Sequoiene*	105°

Compounds with boiling points not determined, or boiling with decomposition:

Asaron	62°
Dibromid	85°– 86°
Cumarin	67°
o-Cumaric acid	200°–202°
Alantolactone	76°
Oxyacid	94°
Cinnamic aldehyde	—
Anilid	109°
o-Methoxy-cinnamic aldehyde	45°– 46°
Heliotropin	—
Piperonylic acid	227°–228°
Vanillin	80°– 81°
Vanillic acid	207°
Maticocamphor	94°
Kessylalcohol	85°
Santalcamphor	104°–105°
Cubebcamphor	65°– 67°
Guajol	91°
Ledumcamphor	104°–105°
Patchoulicamphor	56°
Ylang-Ylangcamphor	138°

THE VALUATION OF VEGETABLE DRUGS AND FOODS.[1]

By Henry Kraemer.

(*Concluded from No. 11, p. 545.*)

IV. BIOLOGICAL METHODS.

By biological methods for estimating the value of drugs is meant those methods which involve the consideration of the effect upon or the degree of resistance manifested by the animals or plants upon which experiments are made, or to which the drugs are applied or administered. Chronologically considered the biological were the first methods employed in ascertaining the value of commercial products.

The valuation of perfumes, spices, beverages of all kinds, etc., had been performed until very recently solely by the expert "tasters," or those with cultivated senses of smell and taste. Adulteration and sophistication is carried on to such an extent to-day, however, that it is necessary in many instances to go a step further

[1] Presented in abstract at the meeting of the American Pharmaceutical Association, September, 1899.

in determining the value of the class of foods and drugs originally valued by this kind of "specialist." It is well, however, to remember that even to-day many commercial products are valued according to the appearance, taste, odor and feel as pronounced upon by experts.

Biological methods for the valuation of drugs may conveniently be brought into the following main groups with their subdivisions:

I. Effect or Influence upon Plants:

(*A*) Depending upon the dormant vitality of the plant or drug.

(*B*) Depending upon physiological effect upon plants.

II. Effect or Influence upon Animals:

(*A*) Depending upon the perception or senses of the experimenter.

(*B*) Depending upon the physiological effects upon animals, and including:

(*a*) Effects on insects.

(*b*) Effects on lower animals, as frogs, rabbits, guinea-pigs, dogs, etc.

(*c*) Effects upon man.

(*I A*) Beginning with the consideration of those drugs whose value seems to depend to some extent upon the vitality of the plant yielding them, we may mention seeds (including fruits) and fungi, as ergot. Unfortunately, the author has been hindered considerably in this work for want of authentic material. But sufficient may be said to indicate that there is a relationship between the duration of vitality of plants and the active principles contained therein. A. Juckenach and R. Sendtner, in an exhaustive investigation upon fennel fruits from different localities, find that the value of fennel may be ascertained in three ways besides the extraction of the oil: (1) They find that upon placing the fruits in water those fruits which are richest in volatile oil retain their color and odor. (2) The value of the fruits may be readily ascertained also by means of a microscopical examination. (3) They further find that from 70 to 80 per cent. of the fruits are capable of germination.

At first thought we may be inclined to say that the germination tests of drugs would require so much time that they would be value-

less.[1] But let us consider one instance, viz, seeds of castor oil. We all know how birds and other animals eat the seeds of castor oil in the fall when they are discharged from the capsules. The taste at this time is only slightly different from other oil-containing seeds. The physiological effects of the oil are, however, manifest in both lower animals and man. The question whether the oil in 80 or 90 or even a higher per cent. of germinating seeds is bland and agreeable and yet possessed of all the purgative properties of the oil ordinarily sold would seem to be worthy of investigation. There is probably no other purgative of such great value, and one the taking of which is dreaded so much as this one, and it would seem that the oil in the seeds capable of germination is equally purgative but pleasant in taste, and that the disagreeable odor and taste are rather due to decomposition products formed in the seeds no longer possessing vitality. The writer may be able to do some work along this line this fall, but would appreciate very much if others also would take up this subject.

A study of some other seeds, such as mustard, might also disclose some interesting facts, which would not be lost in that they would certainly interest the plant physiologist. It was, however, in the investigation of ergot that the author was more especially concerned and interested. It is well known that in the drug ergot we have a "sclerotium" or resting stage of a plant. From this "sclerotium" there is produced in the spring a number of club-shaped sporocarps, in each of which are developed asci, containing six ascospores. It is these latter which attack the flowers of the rye in the summer, grow upon the nutriment contained therein and produce with the harvest, in place of the grain, the "sclerotium" again, or what is known as the drug ergot. It has occurred to the author that one way of testing the authenticity of the year's crop of ergot would be to place the "drug" under a moist chamber and grow it like other fungi in order to develop the next generation. The difficulty is to get the ergot fresh. I append a few letters from prominent firms to whom I applied a year ago for ergot of that year's crop.

"DEAR SIR:—Your favor of November 11th is received, and we regret very much to reply that we cannot help you out in the way of

[1] It is a customary practice to submit the barley used in the manufacture of beer to germinating tests.

samples of ergot. For the past two or possibly three years it has been very difficult to obtain fresh ergot, that is, of the year's crop then existing. This year we are having much more trouble than in the past, and two small lots we have already purchased for our next year's wants are of old crop and are somewhat wormy in parts. This we have to manipulate carefully by blowing the wormy parts out and sifting, and then put up in chloroform to secure it from further attacks by these little pests. We have no samples of either our present or past supply, for we grind it all up immediately after importing it in order to put it in the best condition for preserving in chloroform vapor in sealed packages, and then open each package when we make our fluid preparations from it."

"DEAR SIR:—Replying to your favor of the 11th inst., we regret that we have thus far been unable to obtain any ergot which we were satisfied was this year's crop. We can obtain any quantity of the article which is claimed to be this year's gathering, but have no means of verifying the statement, and as a consequence are somewhat inclined to doubt its authenticity. We will, however, make an effort to secure for you the desired quantity of this year's crop as well as of that of two years ago."

I also wrote to Dr. Erwin F. Smith, the well-known pathologist of the U. S. Department of Agriculture, for material, and asked him to give me the results of his experience in regard to the vitality of ergot. The following is an excerpt from his letter:

"DEAR SIR:—I cannot tell you just at present where you can get ergot that will grow. Only rarely have I seen it in abundance. The last time it came under my observation was something like five or six years ago, growing on rye in South Michigan. I could have collected a pint of it then without any difficulty. I will remember your wish should I come across any next summer, or if any is sent in to the Division.

"My impression is that ergot will not grow after one or two years. I have tried a number of times to get ergot six months to two years old to form the mature fruits, but have never succeeded, although with fresh material this ought not to be difficult."

This is as far as I have been able to go with this investigation; however, the facts recorded would seem to point to the inference that one test for good ergot would be that depending upon its germinating qualities, *i. e.*, producing the sporocarp of the next generation.

(*I B*) A most interesting field of operation in determining the value of drugs is opened up through the investigations of the botanists of the University of Wisconsin on the toxic action of various chemicals upon plants. The several papers by True, Kahlenberg, Hunkel and Heald, in the *Bot. Gaz*, *Pharm. Review* and *Bot. Centralbl.*, are all deserving of careful study. We may say in a general way that "compounds which have a toxic effect upon animals are generally poisonous to plants, although we find different degrees of sensibility to the same compound in both plants and animals."

In analyzing the osmotic and toxic properties of different substances, True[1] compares them with cane sugar, proceeding as follows:

Different strengths of solution of cane sugar are made up, based on the molecular weight of the substance in the requisite number of liters required to give the concentration desired. He places spirogyra filaments for twenty-four hours in these solutions of different strengths and notes the strongest solution in which they will survive. This strength solution is termed by him the *boundary concentration, and is regarded as measure of the purely osmotic action capable of being sustained by spirogyra.* Having determined this point, he calculates, by use of methods in no way involving the living cell, the concentration of the solutions of other substances studied, which have an osmotic value equal to that of the experimental boundary concentration of cane sugar.

The results of experiments of this kind on different substances would indicate that (1) "if the algæ survived in a concentration greater than that calculated from the value of cane sugar, the conclusion would necessarily follow that the substance in question was less harmful to plants than sugar. This condition of things was in no case realized. (2) If the algæ first survived in the calculated concentration, the action of the substance would be purely osmotic and equal to that of cane sugar. (3) If the algæ should first survive in a concentration more dilute than the calculated boundary concentration, the substance in question would be more harmful than sugar."

"In the realization of the third case, injury by one or both of two possible methods might be wrought: (1) by a very rapid extraction of water from the cell violence might be done to the protoplasm

[1] *Bot. Gaz.*, 1898, p. 408.

through the lack of opportunity for the organism to accommodate itself to the change; (2) toxic action, due to the chemical interference of the substance in solution with the molecules of living substance, might also take place. In each special case it would be necessary to ascertain the kind of injury operating. In doing this certain plain considerations should be borne in mind. Should spirogyra be found to survive at a concentration greater than that causing plasmolysis and less than the calculated boundary, the deleterious action would in greater probability be due to the osmotic properties of the solution. If, however, the algæ should die in a concentration less in osmotic value than the cell-sap, *i. e.*, at a concentration weaker than the plasmolyzing strength, death could hardly be attributed to the water-extracting properties of the molecules or ions."[1]

In the course of studies by Kahlenberg and True, using sodium salts of a number of acids, mainly organic, the boundary concentrations for spirogyra were obtained. A wide range of variation was found. In but one instance did a salt give a boundary concentration greater than 0·04 gramme molecule per litre (sodium hippurate, 0·08 gramme molecule per litre), and in a number of cases the algæ did not survive until a solution containing but 1 gramme molecules in 200 litres was reached, viz., sodium cinnamate and sodium protocatechuate. In no case does it appear probable that osmotic action plays any noticeable rôle in bringing about the death of the plants; in all cases, therefore, practically toxic action only can be involved as the cause of death.

In addition to the experiments upon algæ, Kahlenberg and True[2] have used germinating seeds of *Lupinus albus*, and Heald[3] has further worked with seeds of *Pisum saturum*, *Zea mays* and *Cucurbita*

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[1] "The boundary concentration of cane sugar, the osmotic value of cane sugar and that of the substance in question being given, the boundary concentration would be found to be related to that for cane sugar inversely as the known osmotic values, according to the proportion

$$S : x : : ox : oS,$$

in which S is the boundary solution of cane sugar, x the boundary solution of the substance, ox the osmotic value of the substance, and oS the osmotic value of cane sugar."

[2] *Bot. Gaz.*, 1896, p. 81.

[3] *Bot. Gaz.*, 1896, p. 125.

pepo. For details of the manner of study see Heald's paper. Sufficient is it to say that the roots of the germinating seeds, when about 20 millimetres long, are marked at a distance of 15 millimetres from the top by means of a fine brush and India ink. They are then held in perforations in a cork so that the root is immersed in the liquid of desired concentration and substance. Growth of seedlings is allowed to take place in a dark chamber with a nearly uniform temperature (21 to 23° C.). At the end of twenty-four hours the seedlings are removed and measured again. The roots are also examined for other symptoms of poisoning, besides the retardation or inhibition of growth. They are then replaced for another twenty-four hours, when measurements are again made.

The solutions of the various concentrations of different substances produce varying results. In the more concentrated solutions growth may not take place at all. In the more dilute solutions growth may be very rapid. In some cases there is a diminution in size of the root.

These writers have experimented with a large number of inorganic substances, and recently True and Humkle[1] have extended this method of study to that class of organic bodies known as phenols. They experimented with germinating seeds of Lupinus albus and Spirogyra with the following substances:

Phenol; phenol + 1NaOH; pyrocatechol; resorcinol; resorcinol + 1NaOH; hydroquinone; pyrogallol; phloroglucin; ortho-cresol; ortho-cresol + 1NaOH; meta-cresol; meta-cresol + 1NaOH; para-cresol; para-cresol + 1NaOH; carvacrol; carvacrol + 1NaOH; thymol; thymol + 1NaOH; orcinol; ortho-nitrophenol; ortho-nitrophenol + 1NaOH; para-nitrophenol; para-nitrophenol + 1NaOH; nitrobenzine; tri-nitrophenol (picric acid); sodium picrate; anisol; guaiacol; ortho-oxy-benzoic acid; sodium salicylate; methyl salicylate.

As a result of their work, they found that, "except in isolated instances, electrolytic dissociation plays but a very subordinate rôle in determining the toxic properties of substances. Picric and salicylic acids strongly dissociate and become powerfully poisonous, by virtue of the H ions, in great measure. Pyrogallol and, probably, methyl salicylate, first undergo other molecular changes, after which

[1] *Bot. Centralbl.*, No. 1898, 48-51.

their products dissociate electrolytically. Here the H ions may account for much of the toxic action. In the cresols and mononitrophenols, electrolytic dissociation seems to exert a pronounced influence. Some phenols are comparatively weak in this integrity, but quickly change to substances containing constituents even more fatal than H ions. Pyrocatechol, and especially hydroquinone, are of this class.

"Certain radicles seem to have specific properties when introduced into the molecule, modifying the toxic value. The number of hydroxyl groups (OH) present seems to have little influence on the toxic action of the phenols, as in the series benzophenol (OH), resorcinol (2OH) and phloroglucin (3OH). The introduction of the methyl group (CH_3) into the benzine nucleus increases the toxicity to a considerable but rather variable degree, as in the cresols, less plainly in orcinol. The introduction of the isopropyl group [$—CH_3(CH_3)_2$] into the cresols increases the toxic value of these substances, as carvacrol and thymol. The presence of one or more nitro groups (NO_2) increases the toxic action to a great degree; mono- and tri-nitrophenols. An increase in the number of the NO_2 groups present does not seem to increase the toxic action. When the H of an OH group is replaced by a (CH_3) group, little influence seems to be exerted on the toxic action, *e. g.*, anisol and guaiacol. The carboxyl group (COOH) brings with it a degree of toxicity corresponding directly to the degree of dissociation and the number of H ions it affords; salicylic acid."

It is apparent, from this brief review of some of the more important points of the work on the application of the theory of the dissociation of electrolytes to explain the toxic action of various substances on living organisms, that it has not only an important scientific interest, but one which is likely to yield in a practical manner some very important results. For instance, Kahlenberg and True recognized from the beginning the adequacy of this theory to explain the action of antiseptics, and later Paul and Kroenig[1] verified these views. Certain plants, however, show a marked sensitiveness to certain substances; for instance, spirogyra is far more sensitive to the heavy metals, but is more tolerant towards acids than the seeds of Lupinus albus. On the other

[1] *Zeitschr. f. physik. Chemie*, 1896, p. 414.

hand, spirogyra is less sensitive towards phenols than are lupines. It seems to the writer not at all unlikely but that we have here in the possible application of the work of True and others a field with unusual opportunities for study in the indirect valuation of some of our potent drugs.

(*II A*) The valuation of drugs by means of methods which call into play the senses of the investigator has the objection that the personal element is a variable one. Nevertheless, methods of this kind are still employed upon many commercial products and have a certain value in their ready or quick valuation. While these methods, as applied heretofore, have been more or less crude, it does not seem at all unlikely but that the time may come when certain departments of physiology and physics will contribute to our more intimate knowledge of substances and their effects upon the senses. This may be illustrated in noting the taste, odor, touch and color of the substance or its solution in some instances.

The author made some experiments to determine the least amount of substance which, when treated with a proper menstruum, would give the characteristic taste or odor of the drug employed.

(1) The following are the drugs upon which experiments were made to ascertain the weakest solution, a few drops of which would still give the characteristic taste.

(*a*) *Nux Vomica* (containing 2·25 per cent. of alkaloids).—0·100 gramme of finely powdered nux vomica is shaken in the course of several hours with 500 c.c. of water. Ten c.c. of this solution, diluted with 90 c.c. of water, a few cubic centimeters still possess appreciably the characteristic taste of nux vomica. One c.c. of this solution is calculated to contain 0·0000045 gramme of the alkaloids.

(*b*) *Cinchona* (containing 7 per cent. of total alkaloids, of which 3 per cent. is quinine).—0·500 gramme of the powder is mixed with 500 c.c. of water as above, etc. Ten c.c. of this solution are diluted with 50 c.c. of water, a few cubic centimeters are found to still give the characteristic taste of the alkaloids of cinchona. One c.c. of this solution contains ·000005 gramme of quinine, or about ·000011 gramme of total alkaloids.

(*c*) *Aconite Root* (containing 0·50 per cent. of aconitine).—0·500 gramme of the finely powdered aconite is mixed with 500 c.c. of water and shaken occasionally during the course of five minutes. A few cubic centimeters of the filtered solution, if swallowed, produce a distinct and characteristic sensation in the throat.

(*d*) *Gentian Root.*—0·500 gramme of the finely powdered drug is shaken with 500 c.c. of H_2O for a few hours. Ten c.c. of the filtered solution are diluted with 10 c.c. of water. A few cubic centimeters of this solution give the characteristic taste of gentian.

(*e*) *Calumba.*—The solutions of this drug correspond essentially to gentian, imparting, however, the characteristic taste of calumba.

(2) A very appreciable difference in the quality of some drugs containing volatile oils is manifest on treating 0·100 gramme of the drug with 1 c.c. of deodorized alcohol and noting the odor produced by a small quantity dropped on a piece of filter paper. In this manner the superiority of Penang to Zanzibar cloves is at once discerned. The differences in the odor of solutions of the cinnamons is probably even more marked.

On mixing 0·1000 gramme of black mustard in a porcelain capsule with sufficient water to moisten it, there is immediately developed a pronounced and persistent odor of the volatile oil of mustard.

(3) The sense of touch is employed by millers to some extent, but probably has more value as a qualitative test. Brokers who deal in cereals, however, use the sense of touch in the "doughing test," which is employed in determining the value of commercial flours.

(4) In regard to the employment of color as a test, it may be said that certain drugs and foods develop characteristic colors when moistened with water or alcohol or upon treatment with chemicals, as, for example, in the latter instance, the action of iodine and phloroglucin. The intensity of the colors produced is, in a measure, of quantitative as well as qualitative value.

(*II B*) We now come to consider what promises to be one of the most important problems involved in the valuation of drugs, viz., that of pharmacological assay. For our purposes the work may be divided into a number of classes depending upon the class of organisms that are affected. The following subdivisions may be made: (1) effects upon micro-organisms; (2) effects upon insects; (3) effects upon lower animals, as eggs of sea-urchins, fish, guinea-pigs, rabbits, dogs, etc.; (4) effects upon man.

(1) The study of the action of drugs upon micro-organisms, and the study of the products produced by these organisms, belongs

to bacteriology and pathology. Both of these branches may be looked upon as departments of biology. The antiseptic or germicidal effect of different substances upon harmful organisms is one of the most important subjects, from a practical standpoint, that may be considered. On the one hand, the study of the toxalbumins or proteid poisons of various micro-organisms, as well as of many higher animals, as snakes, spiders, etc., has opened up a particularly inviting field during the past ten years. The work of True and others, already referred to, has done much to clear up the mystery surrounding this subject, and we hope that the practical application of the work of these authors may be fully appreciated. By experiments of the nature proposed, the question can be satisfactorily answered, what is the least amount of antiseptic or antidote that is necessary to produce the neutralization of the poison or death of the organism producing the poison?

(2) The valuation of insect powder has been attempted in a number of ways, depending upon amount of ash, color and per cent. of extract, microscopical characters, direct effect upon flies and other insects. Probably the most satisfactory method is to take about 0·250 gramme of the powder, place it in a small homeopathic vial and subject an insect (say a fly) to its influence. The latter should be paralyzed in one minute and killed in about two or three minutes. Other insects, as cockroaches, beetles, etc., manifest more resistance to its effects, and may not be killed, according to J. R. Hill, for fifty or sixty hours. It is interesting to note from the experiments of J. M. Francis that much valuable substance may be lost unless experiments of this kind are carried out. He found, upon experimenting with three different powders: (1) made from the flowers only; (2) made from the stems only; (3) made from an equal mixture of flowers and stems, that when these powders were sprinkled or blown, by means of the "powder gun," on flies and other insects in traps, or on dogs infested with fleas, there was seemingly no difference in the rapidity of action or toxicity of that made from flowers and that made from both flowers and stems. The powder made from stems alone, however, appeared a little weaker, but even this showed a surprising activity.

These results point again to the fact that in practice what is desired is an insecticidal powder that will simply do the work, and

that the application of a powder that is stronger than is required means the wasting of that much material. No other means of testing powders and other substances possessing insecticidal properties is probably so valuable and so simple as that of subjecting insects directly to their action.

(3) The study of the effects of drugs upon the lower animals has been performed for a great many years. Frogs, rabbits, guinea-pigs, dogs, etc., have been experimented upon, and more or less valuable results have been obtained. The results of the experimental physiologist or investigator have not always agreed with those of the clinician. It is but natural, however, that differences should arise between these two classes of observers. The reason for this is as Dr. Cushny (in "Text-book of Pharmacology and Therapeutics," 1899, p. 18) says: "Doubtless there are often faults on both sides. The scientist sometimes insists too strongly on deductions drawn from a limited number of animal experiments and refuses to admit results which have been obtained in thousands of cases of disease by competent observers. On the other hand, the therapeutist often lays too little weight on the general principles governing the interaction of the drug and the organism. Both often exceed the limits of their provinces, the scientist in refusing to admit effects of which he has perforce but a small experience, the clinician in attempting to refute the deductions founded on experiments which he has no opportunity of verifying." "Fortunately for the progress of medicine and pharmacology, the scientific clinician is imbued with a desire to ascertain the methods in which drugs act, as well as to cure disease, and thus unites clinical observation with pharmacological research. It is to be anticipated that the results of the practical physician and of the experimental investigator will come into more complete accord as more exact methods of clinical research are used by the former and a wider laboratory experience is attained by the latter. But both methods are necessary for a complete knowledge of the action of a drug. Animal experiments cannot be dispensed with, for only thus can the action of drugs be ascertained in detail and expeditiously, and at the present time, when a new remedy appears almost every week, it is impossible to await the verdict of the clinics to separate the useful from the worthless, even if it were permissible to apply to the human subject drugs of unknown action and potency."

The words of Cushny, coming, as they do, from a physician, have necessarily considerable weight, and point to the conclusion that in many instances the effects of drugs may be most satisfactorily ascertained by laboratory experiments upon the lower animals. That qualitative results are obtained in this manner is not to be doubted. The question seems to be, are quantitative results which are of value likely to be obtained? From the experiments of True upon plants and of Loeb upon eggs of sea-urchins, fishes and other lower animals, we see no reason why approximate quantitative values of drugs and their preparations cannot be obtained. Even though the results may not represent all that is to be desired, we cannot but believe that they are of far more value in at least certain drugs than any other value of the drug that may be given.

There are a number of drugs, viz., ergot, ipecac, physostigma, strophanthus, digitalis, belladonna, Rhamnus purshiana, etc., whose efficiency may be probably best determined by studying their effects upon lower animals. The values obtained by this means mean more to the practitioner, and will dispel more or less of the uncertainty that attaches to the administration of these drugs or their preparations.

It is well known that the ophthalmologist has pharmacological values for the different mydriatics and myotics. In response to a request to Dr. Wendell Reber, of Philadelphia, for the relative potency of the different substances which affect the pupil of the eye, I received the following:

The smallest quantities in solution of these substances that will affect the pupil are: Homatropin hydrobrom., gr. $\frac{1}{30000}$; eserin sulph., gr. $\frac{1}{100000}$; atropin sulph., gr. $\frac{1}{150000}$; and hyoscyamin hydrochlor., gr. $\frac{1}{300000}$. Taking homatropin as the unit, the relative strengths of the mydriatics and myotics appear to be:

Pilocarpin	¼
Eserin	6
Atropin	30
Hyoscyamin	75

Dr. Reber also informed me that the anæsthetic effects of the different anæsthetics were being calculated or measured by an æsthesiometer. The æsthesiometer, invented by Sieveking, consists essentially of two movable points, which, being placed upon the skin, or upon a mucous membrane, are approximated until the two tactile

sensations afforded by the two points are blended into one, and the patient says that but one point is felt. The distance between the two points, indicated on a scale attached to the instrument, is inversely proportional to the delicacy of tactile sensibility. Of course it is most used in hunting for anesthetic or hypesthetic (lessened sensibility) patches in the skin in suspected hysteria, but it has a distinct field of pharmacologic use in estimating the effects of local anesthetics, particularly on mucous membranes or over cutaneous areas subjected to hypodermic injections of the various candidates for anesthetic honors. Surely we must bear in mind that the world is not standing still and that the old physiology and physiological methods, based on theories which have not been satisfactorily demonstrated, are giving gradually way to the newer methods of research based on the results and experience of recent years.

We need not wonder that there are many who do not as yet comprehend the importance of biological assay, for it must be borne in mind that this subject is still in its infancy, and that it is only within the past few years that it has received any consideration at the hands of experimental physiologists.

(4) The results of the clinician represent those of experiment upon man in disease. It may be said that the experience of the ages has come down to us, each race and tribe contributing something of value. The Indian of Peru has taught us the value of cinchona and coca. The Hottentots, from their experience, found out the value of buchu, and examples of this kind can be multiplied. As new localities are explored, new drugs and foods are discovered which have been employed by the native inhabitants. Many more, however, are the discoveries of the present day in the laboratory of the chemist of either new constituents in plants or new synthetics, created by his synthesis, from other materials. The value of these new medicaments, however, is now first ascertained upon some of the lower animals, and it may be that experiments upon plants will show that some of this work, in at least determining the toxicity of the new compounds, may be satisfactorily done upon either germinating seeds or upon algæ.

V. OPTICAL METHODS.

The valuation of some drugs, and the products obtained from them, by means of the microscope, spectroscope and polariscope is

well known. We have already, in a previous portion of this paper, referred to the value of the microscope for this purpose. We may add, however, that not only are the spectroscope and polariscope valuable adjuncts in the examination of drugs, foods and preparations, but the micro-polariscope and micro-spectroscope each reveal certain characteristics which are deserving of greater attention than they have heretofore received. A mere mention is made of these facts at this time, and will be dwelt upon more fully in a subsequent paper.

CONCLUSION.

From this rather broad consideration of this subject, the value of which can only be confirmed in some instances by the experiments of future investigations and by the experiments of a number of workers, it is apparent that the valuation of the various medicinal substances is dependent upon a large number of very different methods, involving a knowledge of many branches of science.

The author is well aware that some of the methods proposed will have to be worked over very carefully before they can be adopted with any degree of authority. But it was considered desirable to bring this subject to a focus in this manner so that an opportunity might be afforded all of us to work along lines which, while involving the highest technical skill and training on the one hand, would, on the other hand, bring to light methods for the valuation of drugs which would be inexpensive and practicable to the retail pharmacist. It seems to the author that each drug has properties or constituents which will make it possible for it to be valued in one of the four general classes of methods proposed, viz.: (1) Chemical; (2) physical; (3) biological; (4) optical.

Each of these methods will be shown to have its limitations, and in some cases several or all methods may be advantageously employed.

While there are, no doubt, imperfections in this paper, still if, on the basis of the experiments already carried out by the author and other investigators, and as suggested in this paper, methods may be at least devised which will have a practical value to the retail druggist in either elaborating upon or approximately estimating the value of his purchases of vegetable drugs, the work upon the paper will not have been in vain.

EDITORIAL.

THE REVISION OF THE U. S. PHARMACOPŒIA AND SOME OF ITS PROBLEMS.

As the time for the meeting of the delegates of the Decennial Convention of the 1900 Pharmacopœia approaches, considerable interest in the work to be undertaken is manifested by nearly all of the members representing both the professions of medicine and pharmacy. That there are many problems to come before the Convention is very apparent, but there are some problems which are of more than ordinary importance and which will require for their final solution the most liberal conservatism on the part of the members of the Convention and of the Committee on Revision. Very fortunately we are able at this time to give our readers a paper (see this JOURNAL, p. 559) from the pen of Dr. Charles Rice, Chairman of the Committee of Revision of the United States Pharmacopœia, which will command thoughtful attention from all of the intelligent pharmacists and physicians of the United States. We may further add that the members of these professions throughout the world are anxiously awaiting the results of the decisions of the National Convention as well as the Revision Committee. With the revision of the Pharmacopœia for 1890 great advances were made. Every step that was taken was in the direction of true progress. The processes, tests, descriptions, etc., of drugs and chemicals were in general uniformly satisfactory. The emancipation of the Pharmacopœia from the publishing trade and setting it upon an independent basis, so that the proceeds might be used in the making of researches for the coming revision, was one of the wisest and most important steps taken.

The three most important problems which it will be the duty of the next National Convention and Revision Committee to act upon with all the force of imperative necessity are those treated by Dr. Rice.

It is recommended "that the next Committee of Revision be authorized to introduce doses into the Pharmacopœia (details to be left to the Committee)." This is not a new subject, but one which has been discussed on many occasions, and while we may say (1) that there has been little or no progress in establishing the subject of posology on a scientific basis; (2) that the pharmacist and physician are generally conversant with the more or less recognized doses of all the potent drugs in the Pharmacopœia; (3) that really the medicines on which the members of the professions desire greatest enlightenment as to their respective doses are not those that are likely to be inserted in the Pharmacopœia; (4) that it is almost as difficult to say what shall constitute a dose as what is a poison, and (5) that in those potent drugs and preparations which are not standardized, it is hardly possible to give accurate doses; it must be admitted, however, (1) that it would seem that the introduction of average doses into the Pharmacopœia of chemicals and isolated active principles is quite possible; (2) that the development of a system of average dosage ought likewise to be possible with the progress in improved methods in the standardization of the toxic drugs and their preparations; (3) that it may tend to develop more science and greater accuracy in every department of medicine; (4) that it will cause the conflicting statements as to doses of drugs by different investigators and writers to be reduced to a uniform standard, and finally (5) that it may, as Dr. Rice suggests, increase the interest of the physician in the work.

The second recommendation is that "The Committee be authorized to intro-

duce such of the newer remedies as fulfil certain conditions." It must be admitted by all who are cognizant of the progress in medicine during this century that some of our commonest vegetable drugs are recognized to be of greater value to-day than ever before ; and that, while some newer plants have been introduced, the development of synthetic chemistry has given us a host of remedies, some of which are of exceedingly great medicinal importance, and apparently are deserving of pharmacopœial recognition.

In the third recommendation the Committee is " instructed to extend the principle of standardization to as many of the potent drugs and preparations made from them as may be found possible, but that no physiological tests be introduced at the next Revision." Ten years ago the subject of chemical standardization was being considered to some extent. The researches of a large number of investigators since that time have shown that concordant results may be obtained in the examination of certain drugs from the employment of similar methods of procedure, etc. We believe that the time is ripe for extending the principle of chemical standardization to other potent drugs than those recognized in the U.S.P. of 1890. In regard to the matter of standardization by any other than chemical methods, it would seem that the time is hardly ripe for such action. It is well for us to bear in mind, in the consideration of this matter of standardization, as well as other problems, that the National Convention and Committee on Revision are to consider that the research and practice of to-day is always a step in advance of the knowledge that is accepted. There always must be the experimental or " scouting " party in search for new truths, and these are the results that are apt to be upon every tongue, and in every office and shop, and ofttimes uppermost in the minds of those who are engaged in daily practice of the professions. But these things with their reports neither represent truth nor definite knowledge, nor anything that is certain and ought to be made pharmacopœial. This distinction can only be given these reports when this knowledge has been shaped into something definite and certain, and has been repeatedly confirmed by others.

While, therefore, we cannot expect the Pharmacopœia at present to be a popular book in one sense, it is difficult to say what the next ten years will develop. We are making remarkable progress in this country in educational work in both pharmacy and medicine, and it is certain that the Convention must act on these problems, so ably presented by Dr. Charles Rice, with more than usual wisdom and foresight, conservatism and liberality, in the interests of the professions, as well as arts of medicine and pharmacy.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

INDEX-CATALOGUE OF THE LIBRARY OF THE SURGEON-GENERAL'S OFFICE, UNITED STATES ARMY. Authors and subjects. Second series, Vol. IV. D—Emulsions. Washington : Government Printing Office.

This is the fourth volume of the second series of the Index-Catalogue of the Library of the Surgeon-General, and includes 9,628 author-titles, 8,829 subject-titles of separate books and pamphlets, and 28,316 titles of articles in periodicals.

PROCEEDINGS OF THE INDIANA ACADEMY OF SCIENCE, 1898. Editor, George W. Benton.

Besides the president's address, this volume contains abstracts of papers read at the fourteenth annual meeting on mathematical, physical, chemical, botanical, zoological, geological and general subjects. The papers are of an unusually high order, and the proceedings are a valuable contribution to science.

PRELIMINARY CATALOGUE OF PLANTS POISONOUS TO STOCK. By V. K. Chestnut. Reprinted from the annual report of the Bureau of Animal Industry for 1898.

This catalogue contains a list of plants known to be poisonous to stock, a list of plants probably poisonous to stock, and a list of plants suspected of being poisonous to stock.

ONE HUNDRED AND FORTY-EIGHTH ANNUAL REPORT OF THE BOARD OF MANAGERS OF THE PENNSYLVANIA HOSPITAL.

The report of the Board of Managers indicates a year of unusual activity in the work of the hospital. Two weeks after the late war broke out the use of the wards was tendered the Surgeon-General, and hundreds of soldiers were cared for. There were a larger number of patients admitted during the year than heretofore, there being 3,644 new patients received in the wards. A three-years' course is now required for graduation of nurses in the Pine Street Hospital, and an attendance on lectures and an examination by members of the Staff of Physicians. The officers of the Pennsylvania Hospital are: President, Benjamin H. Shoemaker; Treasurer, Henry Haines; Secretary, James T. Shinn.

SHALL PHARMACISTS BECOME TRADESMEN? By George J. Seabury.

This book is a reproduction of a series of articles that appeared in the *Weekly Drug News* and *American Pharmacist*. They were written between 1880 and 1885, together with subsequent reviews on the same subject. The object of Mr. Seabury in reproducing these papers in book form is that they may prove interesting to a new generation of pharmacists and druggists, who, doubtless, are unaware of their existence. The majority of them were written between 1880 and 1883. His extenuation for the constant repetition and pleading for the pivotal foundation of power, unity and organization, was at that time, and still is, to engraft into the minds of pharmacists the stupendous results that are invariably achieved by concentrated power, activity, aggressiveness and vigilance, a power that should be formed into local, county and State organizations, and finally merged into a national association governed by State delegations. The book is written in an original and forcible style, and is intended to encourage the work of organization of all concerned in the progress and future of pharmacy and its trade interests. The author believes that an honestly upheld tripartite compact cannot fail to bring relief and success.

From the Wellcome Chemical Research Laboratories, Frederick B. Power, Director, the following pamphlets have been received:

THE ASSAY OF PREPARATIONS CONTAINING PILOCARPINE AND THE CHARACTERS OF PILOCARPINE NITRATE AND HYDROCHLORIDE. By H. A. D. Jowett. An abstract of this paper has already been given in this JOURNAL (see September, 1899, p. 449).

PREPARATION OF ACID PHENYLIC SALTS OF DIBASIC ACIDS. By S. B. Schryver. It is interesting to note that several of the products described may find applications for therapeutic purposes.

A NEW METHOD FOR THE ANALYSIS OF COMMERCIAL PHENOLS. By S. B. Schryver. A method was described a few years ago by A. W. Titherley (*Trans. Chem. Soc.*, 1894, **66**, 504) by which the reagent sodium amide, $NaNH_2$, could be prepared pure and in considerable quantities without difficulty, and some of its reactions were noted at the same time. Amongst others, it is known that it is capable of acting on bodies containing the hydroxyl group, replacing the hydrogen by sodium, evolving at the same time ammonia. Its action on water, alcohol and phenol may be represented respectively by the three following equations:

$$NaNH_2 + H_2O = NaOH + NH_3;$$
$$NaNH_2 + C_2H_5OH = NaOC_2H_5 + NH_3;$$
$$NaNH_2 + C_6H_5OH = NaOC_6H_5 + NH_3.$$

It is thus evident that for every hydrogen atom replaced in this way, one molecule of ammonia is evolved. The principle of the method proposed by Schryver consists in the treatment of a phenol in a solution of a substance having no action on sodium amide by an excess of this reagent, and estimating the ammonia evolved by the ordinary volumetric methods. Benzene was the liquid usually employed, and the apparatus is diagrammatically figured in the paper.

ANATOMICAL CHARACTERS OF THE SEEDS OF LEGUMINOSÆ, CHIEFLY GENERA OF GRAY'S MANUAL. By L. H. Pammel. Trans. of the Academy of Sci. of St. Louis. Vol. IX, No. 6.

The author has confined his studies to genera and sub-genera. While some excellent morphological and anatomical characters have been found, yet the author finds it often difficult to differentiate closely related species.

CONTRIBUTIONS FROM THE UNITED STATES NATIONAL HERBARIUM. Vol. V, No. 4. United States Department of Agriculture, Division of Botany.

In this volume are contained: "Studies of Mexican and Central American Plants," by J. N. Rose; "Two New Species of Plants from the Northwestern United States," by L. F. Henderson; "Hesperogenia, a New Genus of Umbelliferæ from Mount Rainier," by J. M. Coulter and J. N. Rose; "Three New Species of Tradescantia from the United States," by J. N. Rose; "Treleasea, a New Genus of Commelinaceæ," by J. N. Rose; "Notes on Useful Plants of Mexico," by J. N. Rose.

THE BASKET WILLOW. By Edmund Hersey. Bulletin of the Bussey Institution. Vol. II, Part 8. 1899.

During the forty-six years that *Salix purpurea* has been grown by Mr. Hersey, it has proved to be one of the surest crops the farmer can grow, and also a profitable crop where the osiers are in demand for various manufacturing purposes.

MISSOURI BOTANICAL GARDEN. Tenth Annual Report. St. Louis, Mo.

This report contains, besides the usual reports of the officers, several scientific contributions by F. Lamson Scribner and H. von Schrenk, and a biographical sketch of Edward Louis Sturdevant. An index for Vols. I to X is also incorporated, which will be recognized of inestimable value to all who consult these valuable contributions.

From the École Supérieure de Pharmacie the following publications have been received :

RECHERCHES SUR L'EMULSINE. Par Eugene-Henri Hérissey.

This thesis deals with the distribution of emulsin in the various members of the plant kingdom ; its preparation, properties and reactions.

NOUVEAUX COMPOSÉS CONTENANT UN METAL ET PLUSIEURS HALOGÈNES DIFFERENTS. Par Camille Lenormand.

In this paper are given the results of studies upon some of the halogen compounds of iron and tin : $Fe_2Cl_4Br_2$; $SnCl_2I_2$; $SnBr_2I_2$; $SnCl_2Br_2$.

RECHERCHES SUR LA CRISTALLISATION DE L'OXYHEMOGLOBINE ET DE L'HEMOGLOBINE. Par Charles Rouchy.

This paper deals with the influence of the various substances of the blood and of the use of various solutions in effecting the crystallization of oxyhemoglobine.

LES EAUX DE VERSAILLES (DE 1895 À 1899). Par Eymard Lacour.

This thesis deals with the history and a chemical and bacteriological examination of the drinking water of Versailles.

RECHERCHE DU COLI-BACILLE DANS LES EAUX ET CONTRIBUTION A L'ÉTUDE DE CE MICROBE. Par Joseph-Louis Gaudin.

The author has made an elaborate examination of the organisms in the waters from different sources by cultivation upon the various culture media, and he has obtained forms of *Coli-Bacille* which were very virulent as well as not pathogenic at all.

RECHERCHES SUR LES ORGANISMES MYCÉLIENS DES SOLUTIONS PHARMACEUTIQUES. Par Fernand-Pierre Guéguen.

The author has made a careful biological study of *Penicillium glaucum*, growing this fungus in a number of different solutions.

MINUTES OF THE PHARMACEUTICAL MEETING.

The regular Pharmaceutical Meeting was held Tuesday, November 21st, with Dr. Richard V. Mattison, a well-known member of the College, in the chair.

A very important paper on "Some Pharmacopœial Problems," by Dr. Charles Rice, Chairman of the Committee of Revision of the U. S. Pharmacopœia, was read on behalf of the author by Prof. Jos. P. Remington (see page 559).

Alluding to the paper in a general way, Professor Remington said that it was one which would be largely copied and read, and that it was a matter for gratification to have such an authoritative communication presented at this time.

During the reading of the paper Professor Remington incidentally referred to the work of the Philadelphia delegates to the Convention in 1890, who recommended that, instead of giving the profits to some publishing house, the Committee themselves publish the Pharmacopœia and appropriate the funds thus accruing for carrying on the research and other work of the Committee of Revision, and that as a result of this method a surplus would be reported at the next meeting of the Convention.

Remarking on the recommendations made by Dr. Rice in summing up his

arguments, Mr. Geo. M. Beringer said that the Philadelphia College of Pharmacy was on record as having favored the first and second of the propositions, that in the Convention of 1890 the delegates had recommended the introduction of minimum and maximum doses into the Pharmacopœia. With regard to the third recommendation, he said that he recalled a hint thrown out by the late Professor Maisch at the meeting to the effect that some spurious alkaloid might be added to a preparation to make it conform to a certain standard. The speaker endorsed the proposition and favored the adoption of both quantitative tests and tests of identity for standardized preparations.

Professor Remington said that the pharmacists went into the Conventions of 1880 and 1890 determined to urge the introduction of doses, and that the question was argued both in Committee and in Convention, but that we were beaten both times. The physicians objected seriously to having doses in an official work, as this would interfere with their giving as large doses as they might want to, and that as a result they might be liable to be called upon to answer charges of malpractice.

The speaker said that one reason why druggists favor the admission of doses is because it would enable them to prescribe over the counter with more authority. While admitting that we have numerous convenient dose books, he said that they are not official, and that this is the point which has an important bearing on the legal aspects of the question. He remarked also that the question had come up in the American Pharmaceutical Association, and that some of those on the affirmative side argued that some doctors ought to get into trouble for their carelessness in prescribing. Finally, he thought that physicians ought to exercise more care in marking exceptional doses.

Dr. Clement B. Lowe favored the admission of doses, and said that they had been in the British Pharmacopœia for one or two decades, and that he was not aware of English physicians suffering any annoyance on this account.

The recommendations proposed by Dr. Rice were then voted upon, and unanimously endorsed by the meeting.

A very interesting paper by Dr. G. T. Moore, of Dartmouth College, on "Algæ as a Cause of the Contamination of Drinking Water," was presented in the absence of the author by Dr. Henry Kraemer, and will be published in full in the January issue of this JOURNAL.

Before presenting the paper Dr. Kraemer said that Dr. Moore is a graduate of Harvard University, and that he has been associated with Dr. Farlow in his work on cryptogamic botany, and has had considerable experience in studying the plant forms in the waters around Boston and in New England, and hence was qualified to speak with authority on the subject of the paper.

The paper was rendered additionally interesting to the meeting by reason of the fact that Dr. Kraemer exhibited some growing specimens of algæ and made blackboard drawings of the principal forms described.

The principal groups considered by Dr. Moore were the "blue-green algæ," now classed with the bacteria in the Schizophyta, the diatoms and the class of Syngeneticeæ, which until recently was considered to belong to the animal kingdom. The only genera among the unicellular group which are likely to cause trouble are Cœlosphaerium and Clathrocystis, whereas among the Hormogoneæ a number of genera—particularly members of the nostoc tribe—cause various tastes and odors in drinking water. Among the diatoms only

a few are known to contaminate drinking water, giving rise to certain aromatic odors resembling fish or geraniums. Among the Syngeneticeæ, Uroglena may be said to cause more trouble in water supplies than any other organism—either plant or animal. Synura is responsible for the "ripe cucumber" odor which was formerly thought to be caused by fresh-water sponges.

In some remarks on the paper, Dr. Mattison said that he would have been glad if the author had given or suggested methods whereby the troubles caused by the presence of algæ in drinking water could be eliminated. He said he supposed that it was generally known that while algæ give off oxygen, they also take up oxygen from the water, and this latter action, when in excess of the former, may render it flat to the taste. In addition, some of them give rise to other products, as mentioned by Dr. Moore, which have a deleterious effect upon it. He also spoke of a statement contained in the paper in regard to the condition of water in spring and fall, when it is said to turn over, owing to the different degrees in density caused by the changing conditions of temperature. He referred to the trouble in the Boston water supply some years ago, which caused intense excitement among scientists and people generally throughout this country. The fact that the malarial organism is transmitted through water is now generally admitted.

At the close of the discussion Dr. C. B. Lowe called attention to a copy of a work on "Cowpox," by Edward Jenner, the discoverer of vaccination, which was published in London in 1798. The publisher was Sampson Low, whom the speaker said was probably an ancestor of his. Jenner seems to have had an idea of aseptic vaccine, for he spoke of the deleterious effects produced by vaccine which a physician had carried around in his pocket. A feature of the book was the beautiful colored plates.

Among the specimens exhibited was one of Aralia Californica, presented by Josiah C. Peacock, and specimens of vegetable drugs, by C. H. La Wall. A specimen of Italian fig was also exhibited by Mr. Ross.

On motion, the meeting adjourned.

FLORENCE YAPLE,
Secretary pro tem.

OBITUARY.

THOMAS GREENISH.—On September 28th, Mr. Thomas Greenish, F.C.S., F.R.M.S., one of the most highly esteemed of English pharmacists, died in London, in his 82d year. He was born in Pembrokeshire, and his early education was obtained in a school of the neighborhood. Later he was apprenticed to a chemist and druggist at Brecon, where he remained for five years. After his apprenticeship he went to London as an assistant, first with Messrs. Dalmahoy, of Ludgate Hill, but was soon transferred to Messrs. Godfrey & Cook, of Conduit Street, where he remained about seven years. In looking over Mr. Greenish's career in after years, it cannot but be regarded that this was a very important period of his life, for the course adopted by him at this time was pursued during the remainder of his life with much regularity. He was fortunate in becoming acquainted with the late William Ince soon after his arrival in London, and through the latter's influence became associated in the work of the Pharmaceutical Society from its origin, it having been

founded in 1841. He took the Society's course in pharmacy, and in 1847 became a member under its charter. This same year he left the Conduit Street house and purchased the business of Mr. Sterry in New St. Dorset Square, of which he remained the proprietor for the remainder of his life. It may be mentioned here that he also became the proprietor of the Conduit Street store about twelve years ago. Mr. Greenish soon manifested much interest in the work of the Pharmaceutical Society, contributing many papers to the evening meetings. He was elected a member of its Council in 1871, serving continuously to 1895, when he resigned on account of failing health. He was President of the Society from 1880 to 1882. In 1874 he attended as delegate of the Society the International Pharmaceutical Congress at St. Petersburg, and it was through his instrumentality that the Congress met in London in 1880. Mr. Greenish was one of the best known of English pharmacists on the continent of Europe, having made many visits there. He was a strong advocate for the better education of pharmacists. In the conduct of his own business he made many of the products not usually made by the dispenser, including such substances as amyl nitrite, etc. He devoted considerable attention to the use of the microscope, and believed in its employment as an aid in pharmaceutical research.

Mr. Greenish was an honorary member of the American Pharmaceutical Association, and in 1884 was elected an honorary member of the Philadelphia College of Pharmacy. He was also an honorary member of various European pharmaceutical societies.

GRANT ALLEN, one of the most voluminous and versatile of modern writers, died at Hindshead, Surrey (England), on October 25th. He was born in Kingston, Canada, in 1848, and was educated in the United States, in France, King Edward's School, Birmingham, and Merton College, Oxford, where he was graduated with honors in 1871. He began to publish at an early date, and soon acquired a reputation as a popular writer upon scientific subjects, especially the Darwinian theory of evolution. It was in 1884 that he began to write fiction, and, while his contributions to this class of literature were numerous, it was as a scientific writer that he performed his most notable and enduring work. The reason for this lies in the fact that he loved science and wrote fiction for the purpose of securing an income. Some of his botanical works are used by teachers, and of his writings we may mention "Physiological Æsthetics," "The Color Sense," "The Evolutionist at Large," "Flowers and Their Pedigrees," "Charles Darwin" and "Force and Energy."

ALCORNOCO BARK.—C. Hartwick (*Schweiz. Woch. Chem. Pharm.*, 1899, p. 27) describes the product of *Bowdichia virgilioides*, Kunth. (N. O. Cæsalpiniaceæ), a South American plant, possessing more active properties than jaborandi leaves.

CULTIVATION OF IPECAC IN INDIA.—David Hooper (*Ph. Jour.*, London, 1899, p. 384) records the fact that *Psychotria Ipecacuanha*, when grown in phosphatic manure of India, produces double the amount of root (by weight) than when grown in natural soil.

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NOTES AND NEWS.

PRIORITY IN CERTAIN INVESTIGATIONS OF PODOPHYLLUM.—F. B. Power, in the issue of the *Chemical News* for July 15, 1898, calls attention to some erroneous statements made by Messrs. Dunstan and Henry in a paper entitled, "A Chemical Investigation of the Constituents of Indian and American Podophyllum," and which was published in the *Journal of the Chemical Society*, April, 1898, pp. 209–226. The writer shows that, instead of Podwyssotski being the first to prove the absence of berberine in podophyllum, as would be inferred from the paper referred to, that he (Professor Power) was the first to prove the absence of berberine or any alkaloid in podophyllum, by citing a number of authorities. The writer also claims priority in reference to the observations on the action of fused potash on podophyllin and the statement that volatile acids were formed.

INFLUENZA.—M. Rappin (*Le Progrès Medicale*, August 20th) reports on the various epidemics of "la grippe" that he has studied for many years past in Nantes and in the neighboring districts. In the many different cases that he examined from a bacteriological point of view, he succeeded in isolating one form of bacillus, which seems to him to be the pathogenic agent of the disease. —*The Sanitarian*, October, 1898.

THE VALUE OF FRUITS.—According to *Modern Medicine* fruits are of great value in many forms of disease, on account of the acids which they contain. These acids, when taken into the blood, break up some of the compounds of waste substances which have been formed, and thus give rise to an increased excretion of these substances through the kidneys. In this way fruits are a great advantage in the treatment of rheumatism, gout, gravel and all the different morbid conditions which accompany the so-called uric acid diathesis, including neurasthenia. Obesity may also be successfully treated by a fruit dietary. In fevers, fruits furnish a most appropriate food, particularly in the form of fruit juices.—*Scientific American*, Vol. LXXVIII, No. 23.

LUBRICANTS FOR GLASS STOPCOCKS.—F. C. Phillips (*Jour. Am. Chem. Soc.*) gives the following formula:

Pure rubber	70 parts.
Spermaceti	25 "
Vaseline	5 "

On mixing these together, a mass is obtained which lubricates well, is translucent, adheres to the glass and is not saponifiable. The materials should be thoroughly mixed while hot, the rubber being melted first and the others stirred in. A little more vaseline is required in winter than in summer.

A still better preparation has the following formula:

Pure rubber	70 parts.
Yellow unbleached beeswax	30 "

The rubber is best heated in a covered vessel until thoroughly melted, then adding the wax. The hot mixture should be well stirred.—*Am. Gas-Light Jour.*, October 3, 1898, p. 494.

CRYSTALS IN PAPER.—It has been discovered that old paper, such as is found in old books, sometimes contains beautiful dendritic crystals. It is supposed

that particles of brass or copper have fallen on the paper pulp and have been partly dissolved in the chemicals. The lapse of years permits crystallization. Twenty years is supposed to be required, as also a certain amount of dampness in the paper. The star-like cluster has a width of about 1 millimetre, and may be examined with a small lense or a low-power objective. Dr. Shanks has recently found three of these forms upon linen paper, whose age was not known. Thick and rather soft papers are most likely to contain them.—*The Am. Month. Microsc. Jour.*, October, 1898.

ANNUAL EXCURSION AND DINNER.—The employés of Burroughs, Wellcome & Co., of London, spent a day recently in an excursion to Dover. The Town Hall, where the dinner was given, had been placed at the disposal of the firm by the local authorities. Suitable toasts were proposed and responded to by the members of the firm, employés and press and visitors. Mr. Wellcome stated, among other things in his toast to the employés, that the firm always endeavored to encourage technical education and general development of the minds of those associated with them, and when adding to their staff they tried to secure the services of the very best men.

COLLEGE GRADUATES IN BUSINESS.—Professor Schwab, of Yale, says that the learned professions absorb 62 per cent. of the college graduates nowadays, whereas they formerly absorbed 92 per cent. On the other hand, business pursuits now take 31 per cent., against 6 per cent. in the old days.

THE COLOR OF NEGRO CHILDREN WHEN BORN.—An eminent French physician having had opportunity of making observations bearing on this subject, reports that the negro baby comes into the world a tender pink color; the second day it is lilac; ten days afterward it is the color of tanned leather, and at fifteen days it is chocolate. The coloring matter in the case of the negro lies between the layers of the epidermis. The pigment is semi-fluid, or in the form of fine granulations; in the Indian it is red, and in the Mongolian yellow. It is influenced not only by sun and by climate, but by certain maladies and the negro changes in tint just as the white person does.—*Pediatrics*, Vol. VI, p. 40.

TRACTION ON THE TONGUE IN APPARENT DROWNING.—A report was recently published in *La Tribune Medicale*, which appears to illustrate the value of traction of the tongue in the restoration of the apparently drowned. The author considers that recovery was mainly due to the traction on the tongue and with Dr. Gilchrist, of Nice, suggests that it should be made widely known throughout the lay press that traction on the tongue, repeated regularly fifteen times a minute, is a highly efficacious treatment in many cases of apparent death from asphyxia.—*Brit. Med. Jour.* through the *Lancet* (Winnipeg) Vol. VI, p. 68.

BRAZILIAN EVIDENCE ON THE GENESIS OF THE DIAMOND.—Orville A. Derby (*J. Geol.* 6, 121–146) gives a very complete summary of the facts afforded by the diamond washings of Brazil, that have a bearing upon the origin of this gem; and a comparison with the evidence from the "dry diggings" of South Africa. The conclusion is that the diamond is to be regarded as of metamorphic, and not of truly igneous origin.—*Technology Quarterly*, Vol. XI, p. 106.

CALCIUM CHLORIDE IN HEMORRHAGE.—Hare (*Columbus Med. Jour.*, August 29, 1898) calls attention to the value of calcium chloride in the treatment of small oozing hemorrhages. Dr. Wright pointed out some years ago that the use of calcium chloride distinctly increases the coagulability of the blood; but he also pointed out a fact which must not be forgotten, viz., that after calcium chloride is given in full dose for a number of days a reverse effect is produced, and that delay in coagulation occurs under its influence. The use of the drug should not be persisted in for too long a time.—*Univ. Med. Jour.*, October 1898.

HARA-KIRI.—Dr. Richard H. Harte (*Annals of Surgery*) describes this form of self-destruction which is practiced by Japanese *Samurai* (gentlemen of the military class). The ceremony as carried out by the Japanese is briefly as follows: The condemned, in the presence of only his friends and the high officers of the court, sits upon a slightly elevated platform. A sharp knife is handed him, which he plunges into his abdomen to the left and below the navel, draws it transversely across to a corresponding point on the opposite side and then removes it. He now inclines forward and a *kaishaku* (executioner) cuts off his head with one blow of a sharp sword.—*Ibid.*

RATS AND THE PLAGUE IN INDIA.—According to the *Lancet* (London) evidence that the rat is a factor in propagating the plague, is gradually increasing. At Karachi the observation has been made that the occurrence of a case of plague is not infrequently preceded a few days by the finding of dead rats; this was particularly noticed in the first two or three cases of the recent outbreak. Mice and cats have also been found to suffer from plague. Although so much attention is given to the disinfection of clothing, the evidence that the disease is ever conveyed by this means is very doubtful. The conveyance of the disease by infected rats in grain bags is more probable, as dead rats have been found among the piles of imported bags, and as the disease is very virulent in this species of animal, it is reasonable to suppose that by this means the disease is chiefly spread.—*Scientific American*, 1898, p. 72.

RESEARCH ON THE PRESENCE OF HYDROCYANIC ACID IN VARIOUS PLANTS.—A. Hébert finds (*Bulletin de la Société Chimique de Paris*) that this acid does not occur in plants in sufficiently large quantities to be protective. Certain Japanese plants which contain a comparatively large quantity are only seriously toxic in doses of 300 to 400 grammes. Many others, containing a normal quantity, would require several kilos, to be ingested for any harm to be done.—*Chemical News*, Vol. LXXVIII, No. 2018, p. 60.

REACTION OF PHOSPHORIC ACID ON GLYCERIN.—M. M. Adrian and Trillat (*Bulletin de la Société Chimique de Paris*) show that there is not yet a method known for obtaining phospho-glyceric acid in the pure state—that the acid is decomposed by heat, and even by concentration *in vacuo*, re-forming phosphoric acid.—*Ibid.*

THE DETECTION OF A YELLOW AZO DYE USED FOR THE ARTIFICIAL COLORING OF FATS.—J. F. Geisler (*J. Am. Chem. Soc.*, 20, 110) gives a test which consists in adding a small quantity of Fuller's earth to the fat, placed in a porcelain dish. A pink or violet color is produced if the dye is present. The

test will detect 14 grains per ton or one part per million with ease, and may be used to indicate 0·000000005 mg. of the dye.—*Technology Quarterly*, Vol. XI, No. 2, p. 59.

HYGIENIC METHODS IN HANDLING BREAD.—A recent and novel improvement for the handling of bread, and which has been patented, has been adopted in Berlin. Paper bags are used which are the exact shape of the various sizes of bread turned out by a baker. These are open at both ends, and, being slightly longer than the loaf, the ends are turned together with a twist as the loaf is shoved from the oven straight into the bag. This cover protects the bread from pollution during transportation and is also intended as a protection while the loaf is being used, it being cut at one end as the loaf gets shorter. No doubt such a plan would be received with much satisfaction by the consumers in this country, and, since the name of the baker could be printed on the wrapper, it would also furnish a means of advertisement.—*The Sanitary Record*, through the *Journ. of Med. and Science*, October, 1898.

ECZEMA OF THE LIPS CAUSED BY MOUTH WASHES AND TOOTH POWDERS has been observed by Professor Weisser (*Wien. Klin. Wochenschr.*). In some cases the trouble continued a few months, and in one instance it lasted two years. It is interesting to note that the eczema became markedly improved with the discontinuance of mouth washes and tooth powders containing olive or peppermint oil; and it, therefore, appears that ethereal oils have a bad effect on dermal affections existing near the lips and oral cavity.—*Pediatrics*, Vol. VI, No. 6, p. 280.

A CASE OF LEAD POISONING FROM THE USE OF SODA WATER is reported by Dr. Jamieson in the *Intercolonial Med. Journ. of Australasia*, 1898. The patient, a medical man, drank about three pints daily of soda water made in an ordinary seltzogene, and which, on examination, yielded a considerable amount of lead. The author makes some precautionary suggestions in regard to the use of such soda water.—*The Medical Chronicle*, Vol. IX, p. 461.

DR. SANARELLI'S YELLOW FEVER SERUM has been ordered from the syndicate in Monte Video by three European Governments, and the last Royal Mail steamer brought several tubes of it to the Spanish and Italian Governments, and also a quantity for the British Government, to be forwarded to the Bahamas.—*The Chemist and Druggist*, October 15, 1898.

QUININE FOR HYPODERMIC USE.—According to a note in *Les Nouveaux Remèdes*, the following gives the most suitable solution for all hypodermic uses: Quinine hydrochloride, 3 grammes; antipyrine, 2 grammes; water, 6 grammes. Santesson, of Stockholm, in examining the matter, has shown that the association of quinine and antipyrine leads to the formation of a definite compound—quinopyrine, he terms it—of which the toxicity is less than that of quinine. On the other hand, Stoffela states that the association of the two bodies is useless. He prefers to act as follows: He places 2 grammes of quinine hydrochloride, which has a faintly alkaline reaction, in a test tube, with 100 c.c. of distilled water. Heating to about 40° causes complete solution. The quinine is deposited as cooling, but not for some time, so that the solution can be used warm, and the alkaloid will remain in solution at the temperature of the blood.—*The British and Colonial Druggist*, October 14, 1898.

NOTES AND NEWS.

CROTON OIL.—M. Javillier (*Jour. de Fharm. et de Chim.*, Vol. VII, No. 2) finds that the oil prepared by simple pressure, by lixiviation with ether at 0·758, or by double digestion at 75° in alcohol at 95° has different appearances, gives different results on analysis and also different returns; the first gave 12·5 per cent., the second 38 per cent., and the third 12 per cent. In summing up the results of analyses, it appears that the oil extracted by alcohol differs considerably from the other two, which are almost identical.—*Chemical News*, November 18, 1898.

COMPARISON OF STANDARD METHODS FOR THE ESTIMATION OF STARCH.—H. W. Wiley and W. H. Krug (*J. Am. Chem. Soc.*, 20, 253–266) give a large amount of experimental data which prove all the existing polarimetric methods for determining starch are unreliable. The Lindet method is only approximate. The diastase method gives satisfactory results providing precautions are taken to pulverize the sample to extreme fineness and allow sufficient time for the action of malt, preferably containing pepsin. It is recommended to remove the fat first and also to repeat the malt treatment after boiling and cooling. While noting that the results of cereal analyses are at best but approximate, the authors do not believe that any constituents are present that are unaccounted for unless amounts of complex carbohydrates so small as to be reasonably negligible.—*Technology Quarterly*, Vol. XI, No. 2, p. 60.

GREEN GUTTA PERCHA, according to *Technische Berichte*, is now produced from the leaves of the caoutchouc tree, and is said not only to possess all the advantages of the article obtained by incision into the stem, but even to excel it in durability, so that it can enter into use industrially and commercially in a hitherto unknown way. It is readily prepared and cheap in price, not requiring an expensive purification, which heretofore increased the price of the product 15 to 25 per cent. Besides, it is highly plastic, very strong, can be divided into the thinnest leaves and receives the most delicate and at the same time most distinct impressions by molding and pressing. Moreover, it withstands the action of water and the strongest acids, and even in a worn and broken-up condition is still worth 25 per cent. of its cost of production. The French mail and telegraph department has already commenced its use for the construction of submarine cables.

Schweinfurth, by the way, is said to have discovered in Central Africa a tree, called "tsofar" by the natives, from which also exudes a gum already introduced in commerce. This tree possesses the remarkable quality of giving off flute-like sounds when the wind blows through its branches. These are caused by an insect penetrating into the wood, in order to obtain the gummous substance, thus transforming the tree into a huge Pan flute.—*Scientific American*, Vol. LXXIX, No. 7, p. 102.

THE EFFECT OF TOBACCO ON THE DEVELOPMENT OF THE YOUNG is the subject of an editorial in the issue of *Pediatrics* of December 1st. It is pointed out that the cigarette habit with the young is so enormously on the increase in many countries of the world, notably England, that much alarm is expressed with regard to its evil effects, and legislative measures are said to be in contemplation to restrict the sale of tobacco. Commenting further on the sub-

ject, the writer says: "We take it to be the duty of scientific men who have made a study of the matter to continue to place the results of their researches before the public, so that at least it should not be said that the young slaves to the tobacco habit have not had the opportunity of learning the truth." In this connection some instructive statistics are given. From measurements of 187 of the Class of 1891, Yale, it was found that the non-smokers gained in weight during the college course 10·4 per cent. more than the regular smokers, and 6·6 per cent. more than the occasional smokers. In height the non-users of tobacco increased 24 per cent. more than the regular, and 12 per cent. more than the occasional users. In increase of chest girth the non-users had an advantage of 26·7 per cent. and 22 per cent., and an increase of lung capacity of 77·5 per cent. and 49 per cent. respectively. These observations are corroborated by statistics obtained at Amherst during the same college year. The statement is also made that in France the difference between the students in the polytechnic schools who smoked cigarettes and those who did not, in scholarship, was so great that the government prohibited absolutely the use of tobacco in all the schools under its supervision.

THERAPEUTIC ACTION OF VERATRUM ALBUM AND V. VIRIDE.—According to Cartier, of Paris, these two species of veratrum have some properties in common and also some that are different. He finds that there is too much tendency to prescribe veratrum without the distinctive title, which is usually interpreted to mean veratrum album, thus ignoring the peculiar properties of veratrum viride. In discussing their respective properties, the author states that veratrum album is not indicated in febrile conditions or in congestions, whereas veratrum viride is usually recommended in acute inflammatory fevers. —*Medical Counselor*, through *The Hahnemannian Monthly*, 1898, p. 796.

THE VALUE OF ALCOHOL AS A DISINFECTANT.—Gomer (*Centrabl. F. Gyn.*, May 7, 1898), reporting on a series of experiments which he conducted at the Women's Hospital at Bâle, concludes that alcohol is a much less active disinfectant than sublimate. It fails wholly with the streptococcus, and is totally unreliable for killing spores. To be of any direct value as a germicide it must be used in large quantities, the hands being completely submerged in it during the scrubbing. Merely wetting the skin with alcohol helps only by facilitating the action of the sublimate solution.—*The Brooklyn Medical Journal*, 1898, p. 766.

THE USE OF A BLUE GLASS BETWEEN THE SOURCE OF ILLUMINATION AND THE OBJECTIVE.—In artificial colors, white light is composed of three primary colors, blue, red and yellow. This is not true of sunlight, the primary or fundamental colors of which are composed of red, green and violet. Our lamps generally emit a more or less reddish-yellow light. To correct this, use a piece of the proper blue glass obtained for the purpose from a microscopic dealer. The blue adds the other primary and makes the light practically white. After becoming accustomed to the blue glass it will be very uncomfortable to use the microscope without its aid.—*The Am. Month. Micros. Jour.*, 1898, p. 156.

SUNSTROKE AND BACTERIA.—It is stated in *Natural Science*, May, 1898, that Dr. Lugin Sambon makes a clear distinction between the cases reported as sunstroke, which are due only to syncope and those attended with thermic fever, which he attributes to a specific organism. It is shown that the disease has

definite symptoms and a definite geographical distribution. One evidence that the disease is not due to heat is found in the fact that people in certain regions or under artificial conditions, work in temperatures far higher than exist in places where sunstroke frequently occurs, without suffering from the disease. True sunstroke seems to be confined to certain low-lying countries, where the climate is moist, and absent from more elevated and dry regions. The author compares the bacterium with that of tetanus, claiming that it lives in the soil, and is carried into the system with dust.—*The American Naturalist*, Vol. XXXII, p. 533.

BACTERIA IN GROUND WATER.—The readiness with which bacteria may be conveyed to wells in sub-surface water has been shown in some experiments made on the Rhine near Strasburg, by Prof. E. Pfuhl. Two kinds of bacteria, neither occurring in the Rhine, were placed in a shallow pit nearly full of water and in one hour one species had passed through 24 feet of gravel to a second pit, the other species appearing in the second pit within two hours.—*Microscopical Journal*, 1898, p. 205.

PRESERVATION OF EGGS.—A note is given (in the *Landw. Centralbl. Posen.*, 1897, p. 209) on the successful preservation of eggs by burying them in peat dust. J. H. Thierot (U. S. Consular Reports, 1897, p. 563) gives a report of tests made in Germany of twenty methods of preserving eggs. The most satisfactory methods were (1) to varnish eggs with vaseline and preserve in lime-water, or (2) to use a solution of water-glass. The latter to be preferred, as the coating of the eggs with vaseline takes considerable time, and the lime-water is likely to give them a disagreeable odor and taste. There is, however, one drawback with eggs preserved in a solution of water-glass, viz.: that the shell easily bursts in boiling water. This may be avoided by cautiously piercing the shell with a strong needle.

PASTEURIZATION OF MILK.—C. E. Marshall (*Mich. Sta. Bul.*, 1898, p. 21) has made some experiments on the micro-organisms that are found to be resistant to pasteurization.

In each of twenty-six experiments two bottles of the pasteurized milk and two bottles of the same milk unpasteurized were taken as samples, one set being tested for acidity and the resistant bacteria, and the other set being kept until it spoiled. The data for these samples are given. From the pasteurized milk thirty-nine varieties were isolated and studied. The characteristics of nineteen varieties are given, since these are believed to be representative of the whole. The source of these resistant bacteria was studied by making numerous plate cultures of the dust in the air of the stable, the animal, etc. From these bouillon cultures were made of the different kinds of bacteria, and these cultures were pasteurized. Of those which resisted pasteurization two were from the dust of the stable, two from the dirt from the cow, one from the dairy, and three from the first part of the milking.

As to the effect of these resistant bacteria on the milk after pasteurization, it was found that some only curdled the milk, some peptonized the casein, some did both, while others produced no perceptible change in the milk.

A special experiment on the thermal death point of tubercle bacilli showed that heating the milk containing them at 68° C. for twenty minutes destroyed the bacilli, so that the milk had no injurious effect when inoculated into guinea

pigs. A study of the thermal death points of the resistant bacteria showed that seventeen of the nineteen forms were not killed by a temperature of 80° C. for twenty minutes; six remained alive after heating the same time at 90° C., and one at 96° C., but all were killed by boiling twenty minutes. The effect of sudden cooling after pasteurization upon six of the resistant varieties was studied in a series of tests on bouillon cultures of these bacteria. In each case one culture was cooled suddenly to 8° C. and another allowed to cool gradually to the temperature of the room, the time required for development being noted in each case.

"In this work ten cultures of the suddenly cooled exceeded the time of development of the noncooled; twelve cultures of the noncooled or cooled gradually exceeded the time of development of the cooled; six cultures of the suddenly cooled developed in the same time as the noncooled. Sudden cooling seems to have no effect on the time of development."

The restraining influence of keeping at a low temperature on development was shown in trials with the same six species. Six miscellaneous micro-organisms were treated in the same way but not subjected to pasteurization. Here it was noticed that the time of development was retarded several days by placing them in the refrigerator. The effect of continued heat in restraining development was illustrated in trials with the six same cultures. When the six cultures were pasteurized and then kept in a refrigerator very few of the germs developed in forty-five days.

In conclusion, remarks are made on the value of pasteurization, especially in preventing contagious diseases and intestinal disorders of young children.

IMBEDDED TISSUES WITHOUT USE OF ALCOHOL.—A. Dollken (*Zeilsch. Nuki.*, 1897, p. 32; *Jour. Roy. Micros. Soc.*, 1897, p. 448) proposes the following method:

Where animal or vegetable tissues contain substances soluble in alcohol or ether and thin sections are needed, they may be fixed in chrome-osmium acetic acid and in picric acid solution, after which they may be imbedded in gum and exposed for twenty-four hours to the action of aceton vapor at ordinary temperature. Thinner sections than those obtainable by this method may be obtained according to the following method: Small pieces of tissue fixed in 10 to 20 per cent. formalin are placed in a capsule to which some resorcin and glycerin are added. The mass stiffens in a short time and is capable of being sectioned in a few hours. It may be fixed to the block of the microtome with water glass or syndetikon, and should be sectioned at once, as it soon becomes very hard.

The author also obtained good results by imbedding in soap made as follows: Castor oil or stearic acid, with 20 to 30 per cent. of caustic soda, is boiled for awhile, and, after cooling the alkali, removed by pressure, dilution, or by frequently dissolving the soap. A piece of tissue about 1 c.c. high is transferred from the formalin to a 3 to 5 per cent. solution of soap made with distilled water, and allowed to remain in it 36 to 72 hours in a covered vessel. Solidification is brought about by evaporation or by means of powdered Glauber salts. The block is then fixed to the microtome with water glass and the sections are cut dry. They roll somewhat, but may be straightened in water. The soap must be washed out before staining. The addition of 5 c.c. of glycerin and of alcohol to each 55 c.c. of the soap solution greatly aids in orientation.

NOTES AND NEWS.

WM. R. WARNER & CO. sustained a very heavy loss from the burning of their office buildings at 1228 Market Street, Philadelphia, on February 17th. The entire stock together with the building were completely destroyed, but the full extent of the loss cannot be estimated until their fire-proof safes have been recovered. They have improvised an office and stock room at their laboratory, 639-41-43 North Broad Street, and are enabled to supply goods with their customary promptness.

DR. O. LOEW is now the expert in Chemical Physiology of Plants in the Division of Vegetable Physiology and Pathology of the U. S. Department of Agriculture. This Division is one of the strongest in the Department as the experts represent the best talent in botany. Dr. Loew is at present occupied with the question of tobacco curing and fermenting, on which he has made a series of new observations, and which will be published shortly in a Bulletin. Other problems as those on the "function of the mineral constituents in plants;" "the easy destruction of plant parasites," and "also studies in the relation of various organisms in water," etc., are being investigated.

UPPER REGIONS OF THE AIR.—In a very interesting article in *The Forum* for January, having the foregoing title, Professor Trowbridge, of Harvard University, accounts for the phenomena of the Northern Lights, thunder storms and the magnetism of the earth on the hypothesis that the very short waves of light or energy from the sun are absorbed by our atmosphere and converted into electrical and magnetic waves. The long waves of energy from the sun are called heat-waves, and the intermediate waves, light-waves, both of which we receive in full measure, while the short waves are stopped by our atmosphere and manifested in other ways, as already indicated by the proposed hypothesis. That the sun is concerned in these phenomena the author considers consistent with the great modern doctrine, that all the energy we receive from the sun is electro-magnetic. This hypothesis becomes all the more interesting when, in these later days, as stated by the author, all the observed phenomena of electricity point to the truth of the theory that light, heat and electricity differ only in wave-length.

NEW METHOD OF WATERPROOFING PAPER.—The German journal *Neueste Erfindungen* describes the following method of making a waterproof paper: The sheet is coated on both sides with a solution consisting of 1 part gelatine, 4 parts water and 1 part glycerine. When dry, the paper is immersed in a 10 per cent. solution of formalin. After this treatment, the paper is said to become impervious even to steam.—*Jour. of the Franklin Institute*, 1899, p. 73.

THE PELLETIER-CAVENTOU MEMORIAL.—The total list of subscriptions—which is hardly likely to be much increased now—to this memorial totals up to 12,926 francs. Very few but Frenchmen have subscribed to it.—*The British and Colonial Druggist*, 1898, p. 93.

WASTE OF SWEEPINGS IN STREET CLEANING.—The Department of Agriculture estimates this loss in 354 cities at $3,000,000 annually.

LEAD AS AN ABORTIFACIENT.—The *Lancet* records the case of a married woman, aged 23 years, whose health was described as having previously always

been excellent and who had taken pills of diachylon for the avowed purpose of bringing on a miscarriage. Some days before the fatal issue she had complained of the "use" leaving one of her hands. Subsequently she was seized with violent cramps and pains, writhing in agony, with blood running from her mouth, and she never rallied.

ASSAY OF SENEGA.—Ed. Kremers and Martha M. James (*Pharm. Rev.*, 1898, p. 45) show that the fact that methyl salicylate can be obtained from most samples of senega root by distillation with steam is not a satisfactory criterion in testing for this drug. Samples known to have been false senega yielded the salicylate, while some true senegas did not. The authors point out the fact that the addition of acid in the distillation increases the yield of methyl salicylate, which is evidence that this ester is a product of hydrolysis, perhaps of a glucoside.

ACTION OF HYDROGEN ON ACIDS.—Berthelot has shown that hydrogen has no action upon sulphuric acid at the ordinary temperature. If both are heated together for six hours, at a temperature of 250° C. the reaction is the following:

$$H_2SO_4 + H_2 = 2H_2O + SO_2.$$

Upon sulphurous acid as well as nitric acid containing water, hydrogen has no action either at the ordinary temperature or when heated to 100°–280°.—*Comp. rend.*, 1898, p. 743.

ADULTERATION OF EXTRACT SECALIS CORNUTI.—Italo Cepellini finds that Succus Sambuci may be added to extract secalis cornuti to the amount of 30 per cent. before it is detected by the trimethylamine test on adding potassium carbonate, or may be observed either by taste or odor in the aqueous or alcoholic solutions.—*L 'Orosi* through *Pharm. Zeit.*, 1898, p. 364.

SOMATOSE PREPARATIONS.—The following is a new manner of preparing solutions of somatose, ferro-somatose and lacto-somatose.

Place the powder on the surface of one-quarter to one-half glassful of hot water, and allow the fluid to stand undisturbed (without stirring) for about fifteen minutes, when a complete solution will have been effected. Then, if desired, add to broth, soups, milk, beer, etc.

ADULTERATION OF SICILIAN SUMACH.—In an investigation on the leaves of those plants which are employed for the adulteration of Sicilian sumach (*Rhus coriaria*) R. G. Perkin and P. J. Wood (*Chem. News*, 1898, p. 208) describe the following:

(1) Shinia leaves (*Pistacia lentiscus*) contain 11·3 per cent. of tannin. Two tannins appear to be present, one yields gallotannic acid and the other forms a poison with alkali, acetic acid, phloroglucinol and gallic acid. The coloring matter has the formula $C_{15}H_{10}O_8$, and crystallizes in colorless needles, having a M. P. 204°–206°. It is identical with myricetin, the coloring matter of *Rhus coriaria*. The leaves of *Ailanthus glandulosa* contain quercetin and 11.9 per cent. of tannin. This is a mixture of ellagitannin and gallotannin, and a worthless tanning agent. The leaves of *Ficus carica* contain a coloring principle resembling quercetin. The tannin is small in amount, being 1·6 per cent.

ACONITUM COLUMBIANUM, NUTT., known also as "iron hat," "storm hat," "blue weed," "wolfsbane," "friar's cap," and "monkshood," is found in moist open woods and alongside of brooks in the mountains from Washington and Oregon southward to Lake County, Cal., and the southern Sierra Nevadas (occurring sparingly in Arizona), and eastward in the mountains to Montana, Wyoming, Colorado and as far south as South Dakota. Four other species of aconitum are native to the United States, and a fifth, the common monkshood of Europe (*A. napellus*), is a common garden plant. The western species (*A.*

columbianum, Nutt.) of our American plants is of most interest to us in the United States, as it is the most abundant and most widely distributed. The illustration is taken from Bulletin No. 20, U. S. Department of Agriculture, Division of Botany, with the permission of Professor Coville.

ALKALOIDS OF CURARE.—R. Boehm. (*Arch. d. Pharm.*, 1897, No. 9) has investigated the Tubo-Curare (Paracurare) of Brazil and Peru. The principal alkaloid is *Curine*, which has the formula $C_{18}H_{19}NO_3$, forms white crystals with

M. P. 161°, and is with difficulty soluble in absolute alcohol, methyl alcohol and benzol, while soluble in dilute alcohol and chloroform, and almost insoluble in water. Another alkaloid *Tulocurarin*, which is obtained from the mercury compound of curine by means of carbon disulphid is an amorphous, reddish-yellow mass of great toxic properties, ·001 gramme, killing a dog weighing 1 kilogramme. The iodine compound has the formula $C_{19}H_{22}NO_4$. I.

Another curare (*Calebassencurare*), produced in Venezuela from *Strychnos toxifera* Benth contains *curarin*, which is extracted by means of water, precipitation with platinic chloride and taking up with ether after decomposing the platinum compound. The toxic properties are 0·34 milligramme, killing a dog weighing 1 kilogramme. The iodine compound has the formula $C_{19}H_{25}N_2O$. I.

Another curare yielded by the bark of *Strychnos castelnæa*, Wedd., yielded *protocarin* occurring in colorless crystals insoluble in water, and sparingly soluble in ether, chloroform and alcohol. Another alkaloid protocuridine is also yielded by this curare, which is exceedingly toxic in its properties.

An examination of a number of barks of the genus Strychnos indicated the presence of the curarine as being in the cork, whereas curine is found in the remaining tissues. This still requires further examination.—*Apoth. Zeit.*, 1898, p. 293.

SENECIO AUREUS AS A HÆMOSTATIC.—Gundrum (*Therap. Gaz.*, 1898, p. 655) finds the fluid extract of *Senecio aureus* the most valuable of all remedies in all forms of parenchymatous hemorrhage. It is given in doses of 1 to 2 fluidrachms, and may be prescribed with confidence in all forms of internal bleeding.

YELLOW COLORING OF EUCALYPTUS LEAVES.—From an examination of the leaves of *Eucalyptus makrorhyncha*, of New South Wales, H. G. Smith (*Jour. Chem. Soc.*, 1898, p. 697) obtained 10 per cent. of a yellow coloring matter which he called *Myrticolorin*. It is a glucoside and fills a gap between *osyritrin* obtained by Perkin from the leaves of *Colpoon compressum* and Violaquercetin obtained by Mandelin in *Viola tricolor variensis*.—*Chem. Zeit.*, 1898, 247.

ADULTERANT OF SARSAPARILLA.—A product from the River Amazon is described by Hartwick (*Pharm. Zeit.*, 1898, 684) as resembling in external appearance and in structure genuine sarsaparilla. It contains neither calcium oxalate crystals nor starch, and in the place of the latter sugar is found. It is supposed to be the product of a plant of the N.O. Liliaceæ.

NEW STRYCHNIN COMPOUNDS.—Tapel has obtained a *Desoxystrychnin* by the action of boiling HI and phosphorus and strychnin. The formula is $C_{21}H_{22}N_2O$, and it gives the specific action of strychnin. Upon treating desoxystrychnin with sodium in boiling amyl alcohol a base is obtained $C_{21}H_{22}N_2$ called *strychnolin*, which does not act like strychnin. These results would seem to indicate that the peculiar action of strychnin is due to a piperidin-like atom group, and therefore the author experimented to reduce this group without destroying the molecule. By the electrolytic reduction of strychnin he obtained two compounds, viz., *strychnidin* ($C_{21}H_{24}N_2O$) and tetra-hydro-strychnin ($C_{21}H_{26}N_2O_2$). The physiological action of these substances showed that the peculiar action of strychnin is not due alone to the molecule of the piperidin-like group, but also in part to the oxygen-containing group.—*Chem. Zeit.*, 1898, p. 246; from *Lieb. Ann. Chem.*, 1898, p. 285.

NOTES AND NEWS.

PROF. RUDOLF KOBERT is no longer Director of the Sanatorium Brehmer at Gorbersdorf-Silesia, but is again Professor of Pharmacology and Physiological Chemistry in Rostock-Mecklenburg. This is welcome news as we shall look for further contributions to the literature of this subject from him.

HISTORY OF THE MASSAGE TREATMENT.—This form of treatment, as now practiced by modern Europeans and other English-speaking nations, originated in Sweden, but according to the legends of their country the Chinese were the real originators of massage and other forms of physical exercise.—*Scientific American.*

ARSENIC IN TEA.—An ingenious microbiological method is employed by Morpurgo and Brunner (*Giornale di farmacia*, 1898, p. 195). They place the material containing arsenic in the middle of a piece of potato ready for culture and sow on it the spores of a fungus *Penicillium brevicaule*. Arsenous acid is given off, which is caught in a potassium bitartrate solution and estimated.—*Pharm. Centralh.*, 1898, 670.

MENTAL TELEPATHY.—In these days, when our views with regard to the seen and unseen are becoming more and more rational, partly on account of recent psycological researches, the following from the *Lancet* may be of interest: Sir William Crookes, as is well known, has been bold in expressing his views on what most people consider to be occult subjects, and he has been taken to task for his attitude as a scientific man on these questions. He has been silent for some time, but he evidently felt that the trend of public thought has changed, and so he reverted to a subject which has recently attracted the attention of recognized men of science. Sir William Crookes believes the fundamental law of telepathy to be "that thoughts and images may be transferred from one mind to another without the agency of the recognized organs of sense, that knowledge may enter the human mind without being communicated in any hitherto known or recognized ways." The subject obviously presents many difficulties in the way of practical inquiry, investigation and elucidation; but we do not doubt that some are prepared to accept this postulate. Molecular movements occur in the brain during thought processes, and it is conceivable that physical vibrations are set up, capable, from their extreme minuteness, of acting directly on individual molecules, while their rapidity approaches that of the internal and external movements of the atoms themselves. We need only refer to the Roentgen ray phenomena and the transmission of electric waves without wires in order to find an analogy which lends considerable assistance to the idea.

ELECTRIC SUNSTROKE.—It is reported by the French physician Lavraud that an engineer exposed for an hour, at a distance of about 3 feet, to the rays given out by two connected arcs under a current of 15 amperes, manifested in about three hours all the symptoms of sunstroke. The affection was attributed to the chemical rays, and not to the intensity of the heat, the patient having been situated in that part of the cone of rays where the light was least, but the chemical activity greatest.—*New York Medical Journal.*

ON THE HÆMOCYTOZA OF BIRDS.—Opie (*Jour. Exper. Med.*, 1898) examined 125 birds. The majority of them were obtained from places notoriously malarial; 80 of these birds were English sparrows, and 12 red-winged blackbirds; the others belonged to a variety of species. Fifteen of these birds showed intra-corpuscular parasites in varying abundance. Two forms of the parasite were distinguished which correspond to those described by Grassi and Filletti. In some of their stages of development the parasites resembled the malarial parasite of man; and it may also be noted that both forms of parasites were present in some cases.—*Amer. Jour. Med. Sciences*, Nov., 1898.

FOREIGN BODIES IN THE EAR.—Hummel (*Munchener med. Woch.*) makes the following deductions: (1) The relation of the normal ear canal to inanimate foreign bodies is entirely without reaction; that is, the foreign body in the ear does not, *per se*, endanger the integrity of the ear. (2) Every hasty endeavor at removal is, therefore, not only unnecessary, but can become very injurious. It was also stated that in nearly all cases not previously interfered with, the foreign body could be removed from the ear by syringing. In cases requiring instrumental removal of the foreign body from the ear it was recommended that only specialists in this line should undertake the operation.—*Dunglison's College and Clinical Record*, 1898, p. 194.

DETERMINATION OF TARTARIC ACID IN PRESENCE OF CITRIC ACID.—Borntraeger (*Zeitsch. f. anal. Chem.*, 1898, p. 8) uses a test which depends upon the fact, that on the addition of calcium chloride to a solution (which has been neutralized with KOH) containing various amounts of citric and tartaric acids, the latter, on account of the excess of citric acid, is precipitated as potassium bitartrate.

COMPARISON OF METHODS FOR ESTIMATING CAFFEIN.—E. F. Ladd (*Amer. Chem. Jour.*, December, 1898) tried the four following methods for the estimation of Caffein in tea: Vite's, Peligot's, Crosschoff's, and Gomberg's, with the result that higher percentages were uniformly secured by Gomberg's method than by either of the others. Its simplicity is also an advantage in work where caffein has to be rapidly determined.

AN ACTIVE PRINCIPLE IN MILLET HAY.—On account of the diseased condition of horses, when fed exclusively on millet, which is known among farmers as the "Millet Disease," E. F. Ladd (*Amer. Chem. Jour.*, December, 1898) undertook to determine whether millet hay contained a principle capable of producing marked physiological effects. While the work was not completed, it was considered probable that the substance extracted by benzine was a glucoside. The principle most resembles daphnin, although markedly different from it in some respects. That the principle possessed marked physiological properties was shown by experiments described.

ATROSCIN AND I-SCOPOLAMIN.—T. Gadamer finds (*Arch. d. Pharm.*, 1898, p. 382) that atroscin (Hesse) and i-scopolamin (Schmidt) are hydrates of the same alkaloid. They possess different melting-points and different amounts of water. Further, atroscin is not a new alkaloid, but the labile form of i-Scopolamins, which is only obtainable under certain conditions.

CAFFEIN IN TEA, KOLA AND COFFEE.—J. Gadamer does not believe (*Ibid.*) that the percentage of bound (gebundenen) caffein in the drug should give it particular therapeutic properties, but is of the opinion that the variation of free caffein and that in combination in tea, coffee and kola explains the reason for such variation in the analytical results of different investigators.

CAPER SPURGE, which is also known as garden spurge, myrtle spurge, mole plant, mole weed, mole tree, gopher plant, anti-gopher plant, wild caper, caper bush, wolf's milk, springwort, is botanically known as *Euphorbia Lathyris*, L. It is a herbaceous perennial, 2 to 3 feet high. In the illustration given (which is taken with permission of Professor Coville, from Bulletin No. 2, Division of Botany, U. S. Department of Agriculture), the upper half of the plant, one-third natural size, is given, with a capsule (*b*) natural size. It is a common garden plant, sparingly introduced in wet grounds in California and Texas, and in the Atlantic States from New Jersey to West Virginia and North Carolina.

The fresh milky juice is exceedingly acrid and the fruit is highly purgative and poisonous. When used as a household remedy it often provokes serious trouble. Women and children are not infrequently poisoned by handling the plant and getting the juice on the face. Cattle are quite resistant to its influence, but they are sometimes overcome. Goats will eat the plant extensively if nothing better presents itself, and it is said that their milk then possesses all of the venomous properties of the plant. When applied to the skin the juice causes redness, itching, pimples and sometimes gangrene, the effect often lasting more than a week. The seed taken internally in overdose will inflame the mouth and stomach and cause intense diarrhœa and vomiting. If the dose is sufficient, there will be nervous disorders, unconsciousness, general collapse and death.

ALKALOIDAL DETERMINATION OF CINCHONA.—H. Ekroos (*Arch. d. Pharm.*, 1898, p. 328) employs KOH in place of ammonia and a freshly prepared solution of hæmatoxylin as an indicator. The method, which is also given in abstract in *Sudd. Apoth. Zeit.*, 1898, p. 649, may be applied to extracts of cinchona as well as upon the drug.

GLAZED BOOK PAPER BAD FOR THE EYES.—The effect of glazed papers on the eyesight has recently occupied the attention of some German doctors. In

comparing these papers with those in use in the earlier part of the century, which were mostly of a dull gray or blue color and coarse-grained, requiring thicker type, they point out that the highly glazed surface offers reflections of the light which, with the more elaborate and thinner type, produce a lot of shades and lights that are most trying to the eye. It is, therefore, proposed that the public inspectors of schools should order the use of sanitary paper for the eyes, by which it is meant that a glazed or highly polished surface should be avoided, and the colors chosen should rather be gray or light blue, but no white, and, in fact, no brilliant colors at all. The type should be clear and simple and not too thin.—*Invention* through *Sci. Amer.*, December 17, 1898.

ALKALOID OF LETTUCE.—In an inaugural dissertation presented by A. F. P. van Sou at the University of Marburg, the author deals very freely with the derivatives of the tropins, but the parts which most interest pharmacists (*Chem. and Drug.*, 1898, p. 243) are on *Scopolia atropoides* herb and common lettuce, both of which have been reported to contain hyoscyamine. Dr. van Sou has gone most carefully into the matter, and finds that the scopolia herb contains 0·1258 per cent. of atropine, but no hyoscyamine. T. S. Dymond previously reported to the Chemical Society that he had found hyoscyamine in them. Dr. van Sou has now repeated the work, and while he was able to isolate a small quantity of an alkaloid, he finds that this alkaloid is not hyoscyamine, as Dymond stated, but atropine, because the double gold chloride which the alkaloid affords has a M. P. of 134°–140° C., which agrees with that of atropine gold chloride (136°–138° C.), but not with that of hyoscyamine gold chloride (159°–160° C.). Curiously, Dr. van Sou's results corroborate the observations which gave rise to Dymond's research. It may be remembered that Frank B. Thornton had occasion to examine an extract of lettuce supplied by a certain firm and isolated 0·03 per cent. of alkaloid from it which he identified as atropine. The experiments of Dymond went to show that the alkaloid present was hyoscyamine and the factors given in his paper undoubtedly proved that the alkaloid was not atropine. Against these results of Thornton we now have the opinion of two independent observers: which are we to accept

ANEMONIN.—Noel and Lambert (*Arch. Internat. de Pharmacodyn. Through Pract.*, lxi, 74) conclude that anemonin is not the sole active principle of *Anemone pulsatilla*, and that it does not pre-exist in the plant. By distillation, an acrid oil (anemonol) comes over, which, probably by subsequent oxidation, produces anemonin. The observed pharmacological results obtained with anemonin and with the tincture of the plant are quite different. It is concluded that anemonin does not represent the whole therapeutic value of the plant.—*Pharm. Jour.*, 1898, p. 217.

GERANIUM OIL.—Flatau and Labbé (*Compt. rend.*, cxxvi, 1876) contradict the statement of Schimmel & Co. that the chief acid constituents of Indian geranium oil are equal parts of acetic and caproic acids. They find the chief ester to be a compound of geraniol with an isomer of myristic acid, from which the acid differs only in having a lower M. P., being 28·2° C., instead of 53·8° C. The formula is $C_{14}H_{28}O_2$. Besides this, acetic acid and traces of valerianic acid were isolated. Bourbon geranium oil did not give this new body, but about 1 per cent. of another acid having the formula $C_{10}H_{18}O_{2}$, half of which exists in the free state and the rest as a geranyl ester.—*Ibid.*, 1898, p. 217.

NOTES AND NEWS.

ABNORMAL DEVELOPMENT OF A RATTLESNAKE'S FANGS.—The photograph which is presented herewith was sent to the *Scientific American* by Dr. R. Menger, of San Antonio, Tex., and is a life-like representation of the head of the much dreaded rattlesnake, the Crotalus horridus. The following description appeared in the March 25th issue of the aforesaid publication, to whom we are also indebted for the loan of the cut. The original reptile was a very large rattlesnake, and was killed by a friend of Dr. Menger in the hills of Helotes, about eighteen miles northwest of San Antonio. The rattles and the head of this snake were presented to him and he prepared the fangs, etc., to show their relation to the poison glands. The head was supplied with four fangs, two full grown and two others near them in the front region of the upper jaw. The

exposure was taken by lamplight. The fact of the snake having four fangs is interesting. In all rattlesnakes there are, besides the poison fangs, rudimentary fangs which, upon the loss of the old fangs, develop and supply their place. In this case, however, the development has been abnormal, and the second pair of fangs have developed before any loss of the old fangs has been sustained.

SOLDER FOR GLASS.—A metallic compound which firmly adheres to glass is obtained by melting together 95 per cent. (by weight) of tin and five parts of zinc. The M. P. lies at about 200° (C.?) and the compound is spread upon the glass previously heated to this temperature, by means of a soldering iron. After it cools it adheres firmly to the glass. Another alloy, consisting of nine parts of tin and one part of aluminium may be used, but the M. P. is higher (about 390°). —*Scient. Amer.*, 1898, p. 230, from *Gold u. Silberwaaren Indus.*

TYPHOID FEVER.—Dr. Osler, of Baltimore, in an address on this subject before the New York State Medical Society, laid great emphasis on the fact that for very many years the medical profession had been fully alive to the true nature of typhoid fever. One fact stood out with special prominence—*i. e.*, that with clean soil and pure water typhoid fever disappeared. While many advances had been made in the treatment of this disease, they had been nothing compared to the triumphs of sanitary science. The medical profession could point to typhoid fever as the best understood and the most carefully studied of the acute infectious diseases—the one in which the greatest victories in hygiene had been won. But in spite of these triumphs, we had had a rude awakening last fall in the many soldiers who fell victims to this dread disease. Ours was a nation, Dr. Osler said, of contradictions and paradoxes—a clean people, careful in personal hygiene, but reckless regarding public sanitation. Dr. Smart, the great authority on hygiene, recently made the statement that the cities of this country, as regards the matter of water-supply, were at least a century behind the cities of Europe. In organized sanitation Michigan was one of the model States. The problem of typhoid fever, Dr. Osler declared, was no longer in the hands of the profession; even the lesson of the late war had probably not been bitter enough to teach the public that sanitary science should come within the sphere of practical politics. Our good natured citizens, who always voted a straight party ticket, were not deeply interested in the problems of sanitary science; they were more easily led by a Perkins or a Munyon than by a Lister or a Koch. Our glorious land has been recently described as "God's own country, with man's own backyard, and the devil's own cesspool."

A CONCLUSIVE PROOF OF THE EFFICACY OF VACCINATION—conclusive to those who have not lost both their logical and their common sense—is furnished by the experience of the Germans, and especially of the German army. Dr. Bizzozzero, of Rome, according to the *Lancet*, thus summarizes the German experience:

"Germany stands alone in fulfilling in great measure the demands of hygiene, having in consequence of the calamitous small-pox epidemic of 1870–71 enacted the law of 1874 which 'makes vaccination obligatory in the first year of life and revaccination also obligatory at the tenth year.' What was the result? With a population of 50,000,000, having in 1871 lost 143,000 lives by small-pox, she found by her law of 1874 the mortality diminished so rapidly that to-day the disease numbers only 116 victims a year. These cases, moreover, occur almost exclusively in towns on her frontier. If it were true, continued Professor Bizzozzero, that a good vaccination does not protect from small-pox we ought to find in small-pox epidemics that the disease diffuses itself in the well-vaccinated no less than in the non-vaccinated countries. But it is not so. In 1870–71, during the Franco-German war, the two peoples interpenetrated each other, the German having its civil population vaccinated optionally, but its army completely revaccinated, while the French (population and army alike) were vaccinated perfunctorily. Both were attacked by small-pox; but the French army numbered 23,000 deaths by it, while the German army had only 278; and in the same tent, breathing the same air, the French wounded were heavily visited by the disease, while the German wounded, having been revaccinated, had not a single case."

MANGANESE IN PLANTS.—In confirmation of the theory lately advanced of the importance of manganese in the vegetable and animal economy, P. Richard (*Compt. rend.*, 1898, p. 1882) finds that it is universally present in the ash of all forms of organized matter. Some are especially rich in manganese as the seeds of phanerogams and tissues of rapidly growing cryptogams. Its presence is indicated in cow and horse dung, various marine animals (molluscs and crustacea) and in the bones, eggs, flesh and hair of vertebrates.

ESTIMATION OF OIL IN AQUÆ.—Beckurts and Fierichs recommend the following modification (*Pharm. Zeit.*, 1898, p. 563) of Ranwez's method for the estimation of the volatile oil in aromatic waters: 200 c.c. of the water are placed in a separator and 60 grammes of NaCl added and the oil removed by repeated shaking with ether. The portions containing oil are united, dried with $CaCl_2$ and the ether distilled off until only 10–15 c.c. remain and the ether of this portion is removed by the aid of a filter pump. The temperature of the flask sinks to the freezing-point, thus preventing the escape of any volatile oil. When the ice on the sides of the flask ceases to form any longer, the connection with the pump is severed and the flask dried and weighed. The value of concentrated *Aquæ*, which contain more or less alcohol, cannot be estimated in this manner. Aqua Fœniculi and Aqua Menth. Piperitæ contain 6 per cent. volatile oil.

CANNABINOL.—T. B. Wood and W. T. W. Spirey have prepared the acetate of cannabinol. To this crystalline substance they assign the formula $C_{15}H_{18}O_2$, which differs from that given by Dunstan and Henry. They further find that the so-called cannabinol is not the active constituent of Indian hemp.

A GOOD FIRE EXTINGUISHER.—On September 2d (according to *Chem. and Drug.*, 1898, 574) a two-pound packet of colored fire exploded at Elgil's pharmacy, Durban, and immediately the flames spread, but the heat caused a bottle of ammonia to burst and this appears to have extinguished the fire, which was only discovered on opening the shop the next morning.

OIL OF OLIVE PITS.—Klein shows that the oil of the pits of the olive is made up of the same constituents (excepting arachinic acid, which is wanting entirely in the pits) as that of the pulp of the olive. There is a difference, however, in the quantities of the various constituents.—*Zeitschr. f. Angew. Chem.*, 1898, 37; *Pharm. Zeit.*, 1898, 723.

PERMANENT LEMON JUICE may be prepared (*Pharm. Rundsch.*) when the fresh juice is mixed with one-quarter its volume of talc powder, repeatedly shaken for some hours, allowed to stand and filtered. The filtrate is mixed with 10 per cent. sugar, boiled and put into bottles which have been previously treated with boiling water. They are then corked and sealed with paraffin.—*Sudd.-Apoth.-Zeit.*, 1898, 622.

NEUTRALIZING NICOTINE IN TOBACCO.—Gerald has found that (the *Med. Age.*, 1898, 565) if during the process of manufacture of cigars the leaves are steeped in a decoction, the principal element of which is wild marjoram (*Origanum vulgare*) the deleterious effects of tobacco are avoided, and yet the quality and aroma are not altered.

VASOGEN.—As regards the nature of Vasogen, it will suffice to state briefly, that it is an oxygenated hydrocarbon, *i. e.* a partly oxydized hydrocarbon, and that it has the power of rendering drugs which are incorporated with it soluble in water or emulsifiable with it. Owing to this property, vasogen employed externally forms emulsions with the secretions of the body, and thus becomes rapidly absorbed. This fact has been proved beyond question by the demonstration of the drug in the urine after inunction with iodine, iodoform, creosote and mercury vasogen. Medicaments like iodine, creosote, etc., when dissolved in vasogen, do not irritate the skin or mucous membranes, and consequently can be used extensively both internally and externally.

For external use, liquid vasogen preparations are poured into wounds or are applied to them on cotton or lint; they are also painted upon the intact skin or rubbed into it with the hand. In the latter case they should be plentifully applied, 10 drops to half a teaspoonful at a time and rubbed in gently until the vasogen has penetrated into the skin. Internally, the vasogens are taken in gelatine capsules (Caps. dur. Iodine vasogen, 6 per cent., Creosote vasogen, 20 per cent.), or mixed with milk, coffee, tea, wine or cognac.

Liquid vasogen preparations which have become thick by exposure to cold, rapidly regain their former consistency at a temperature of about 70°. Cold has no injurious effect, but marked heating is to be avoided. The bottles should always be kept well stoppered.

The following preparations are largely used in clinics, hospitals, etc., and are prescribed by physicians:

	Per Cent.
Iodoform vasogen	3
Iodine vasogen	6 and 10
Creosote vasogen	20
Menthol vasogen	2
β Naphthol vasogen	10
Camphor-chloroform vasogen	
Ichthyol vasogen	10
Guaiacol vasogen	20
Sulphur vasogen	3
Tar vasogen	25

These preparations are made by dissolving the various medicaments in the liquid vasogen during its process of manufacture.

"HOPEIN" IN NEW ZEALAND.—*The Australasian Medical Gazette* has published a warning to New Zealand against the advent of "Hopein"—a bogus remedy for cancer—which it states, on the authority of the *Brit. Med. Gaz.*, contains 99 per cent. of morphine.—*The Pharm. Jour. of Australasia*, Vol. II, p. 242.

PROFESSOR ALPHONSO HERRERA, one of the most prominent botanists of Mexico, and for many years professor of medical botany in the National School of Medicine in the City of Mexico, has just been pensioned, according to Egeling, in *Meyer Brothers' Druggist*, with a salary of $200 per month. Professor Herrera was born in the City of Mexico on February 7, 1838. He graduated in pharmacy when twenty years of age and for the past thirty years has filled the chair of professor of medical botany. His works on native medicinal plants are too numerous to mention.

NOTES AND NEWS.

RAILROAD ACCIDENT.—Among the thirty or more persons killed in the wreck which occurred on the Philadelphia and Reading Railroad, at Exeter Station, near Reading, on May 12th, was Mr. William Stahler, the well-known wholesale and retail druggist, of Norristown, Pa. Prof. Joseph P. Remington and Mr. Mahlon N. Kline, of this city, were on the train which was wrecked, but escaped without serious injury. Mr. Kline, save for the nervous shock which he sustained, was uninjured. Professor Remington was bruised about the knee and head, but we are happy to announce has about recovered.

HONOR TO AN AMERICAN CHEMIST.—Dr. Charles F. Chandler, Professor of Chemistry, Columbia University, and Professor of Organic Chemistry, New York College of Pharmacy, has been nominated President of the Society of Chemical Industry, which recently met in annual session in Glasgow, Scotland. Dr. Chandler may be said to be the most representative exponent of industrial chemistry in America. As a teacher he is without a peer. The honor of the Society is well deserved, and, we may say in turn, that the Society is honored by this action.

EDGAR F. SMITH, Professor of Chemistry in the University of Pennsylvania, has recently been elected Vice-Provost of that institution, to succeed Professor Fullerton, who resigned the office about a year ago. Professor Smith is eminent in his profession, and besides being very popular with the students has manifested much interest in the workings of the University, so that the honor is well deserved and the office judiciously bestowed.

J. B. NAGELVOORT, formerly Professor of Applied Chemistry at the Northwestern University (School of Pharmacy) is now an assistant in the *Pharmaceutisch-Laboratorium der Rijks-Universiteit*, Leiden. In connection with his work in the Laboratory he is engaged in special investigations for the Agricultural Department.

GIFTS OF CASH AND BEQUESTS from American citizens for colleges, libraries, hospitals and other institutions designed for public benefit aggregated $38,000,000 last year. In the past six years these have amounted to more than $200,000,000.

SUCCESSFUL CANDIDATES.—At the recent examinations of the Pennsylvania State Board of Pharmacy, held at Harrisburg and Pittsburg, 312 persons presented themselves for examination. Of this number eighty-one succeeded in passing the examination as registered qualified assistant pharmacist, and eighty-six as registered pharmacist, nearly 60 per cent. the largest ever passed. The next examination by the Board will take place at Williamsport, Pa., on Tuesday, July 11, 1899. Further information can be had by applying to Charles T. George, Secretary, Harrisburg.

CLEVELAND SCHOOL OF PHARMACY.—The graduating exercises of the Cleveland School of Pharmacy were held in the Colonial Hotel, Thursday evening, April 27th. Prof. H. V. Arny, who is a regular contributor to this JOURNAL, delivered the salutatory; the degree of Ph.C. was conferred by the President

of the School, Mr. E. A. Shellentrager; Mr. Eugene R. Selzer made an address to the graduating class, and Mr. Bemis V. Spieth delivered the valedictory.

RECEPTION TO STUDENTS.—A reception was tendered to the members of the senior and junior classes and the faculty of the Maryland College of Pharmacy on the evening of April 14th by Charles E. Dohme, of Sharp & Dohme, who is the president of the institution, at his residence, 822 North Carrollton Avenue, Baltimore. Mr. Dohme was assisted in receiving by Mrs. Dohme, the Misses Dohme and Mrs. Dr. D. M. R. Culbreth. The parlors were invitingly decorated with palms, ferns and cut flowers, and a large company assembled. Refreshments were served, and an orchestra rendered music. The function was voted most enjoyable by all present. It has been the custom of Mr. Dohme for several years to give an entertainment of this kind during the latter part of the College term. Among the callers were Profs. William Simon, Charles Caspari, Jr., D. M. R. Culbreth, Daniel Base and John P. Piquett, of the College faculty; Charles Schmidt, H. A. Elliott, H. P. Hynson, Samuel Mansfield, Louis Dohme, Dr. A. R. L. Dohme and others. The two classes were well represented.

AFFILIATION OF PHILADELPHIA BOTANISTS.—At a recent meeting held at the Philadelphia College of Pharmacy the following bodies effected an affiliation, whereby efforts will be made to promote the general interests of the botanists of Philadelphia and vicinity: The Philadelphia Botanical Club, Academy of Natural Sciences, Philadelphia College of Pharmacy, Philadelphia Moss Chapter, Lotus Club and the Mycological Society of Pennsylvania. The work of the affiliated societies will be in the hands of a Council composed of the presidents and secretaries (or two such representatives as each society may select) of each of the organizations represented. At a meeting on May 9th Geo. M. Beringer, A.M., was chosen chairman of the Council and Prof. A. F. K. Krout secretary.

MARINE BIOLOGICAL LABORATORY.—The twelfth session of the Marine Biological Laboratory at Wood's Holl, Mass., will be held from June 1 to October 1, 1899. C. O. Whitman, professor of zoology, of the University of Chicago, is director, and under him are an able corps of instructors. Courses of instruction will be given in zoology, including (1) morphological and embryological research, (2) cytological research, (3) embryology and (4) animal morphology; general and comparative physiology; comparative psychology; and botany, including (1) cryptogamic botany, (2) plant cytology and (3) plant morphology and physiology.

It is interesting to note that two schools of pharmacy are represented on its corps of instructors, namely, the Philadelphia College of Pharmacy, by Prof. Henry Kraemer, and the University of Wisconsin, by Prof. Rodney H. True.

An excellent opportunity is afforded teachers and others who wish to do special and advanced work along the lines indicated, and a hearty co-operation of those interested in this class of work is desirable.

THE PHILADELPHIA EXPOSITION, under the auspices of the Philadelphia Commercial Museum and the Franklin Institute, will be held from September 14 to November 30, 1899. This is the first national exposition of American manufactures especially suited for export trade. Another event which will add

interest to the occasion commercially will be the Second International Commercial Congress, at which the important commercial nations of the world will be represented by specially appointed government delegates. Besides these delegates it is predicted that influential business men will come as representatives of over 300 of the leading foreign Chambers of Commerce of Latin America, South Africa, India, Australia, China, Japan and other countries.

Every facility for the full and free discussion of all topics of interest in international trade, by men practically interested and competent to consider all phases, will be afforded.

The undertaking has been characterized by a broad and liberal spirit and has received the support of the Congress of the United States, the Legislature of Pennsylvania, the Councils of Philadelphia, and has been supported and endorsed by trade organizations throughout the country.

REGULATIONS TO PREVENT THE SPREAD OF BACTERIAL DISEASES.—Governor Roosevelt, of New York State, has signed the bill to prevent the spread of bacterial diseases and permitting witnesses to dispense with the kissing of the Bible in the administration of oaths. It is very satisfactory to note that proper sanitary regulations have now reached even the police courts, where they were badly needed. For a long time, however, many of the magistrates have not used the Bible in the Court room, or have warned witnesses against using it, and great credit is due to Magistrate Pool, who inaugurated the move to do away with the kissing of the Bible in Court.—*Scientific American*, April 29, 1899.

AN ATTACK ON BACTERIOLOGICAL INVESTIGATION.—Not long ago an attempt was made by the Austrian Legislature to suppress bacteriological laboratories, but the Minister of Public Instruction and the chief of the sanitary department protested against such suppression in the interest of civilization, maintaining that all that is needed is greater care in the management of the laboratories. It is thought that the recent unfortunate occurrence of the plague in Vienna was the cause which excited the Legislature to assume this attitude.—*The American Practitioner and News.*

NEW HARDY EDIBLE ORANGES.—Under the auspices of the U. S. Department of Agriculture, effort is being made to produce hardier varieties of the orange by hybridizing with what is commonly known as the Hardy Orange, *Citrus* or *Limonia trifoliata* (properly *Triphasia Aurantiola*). Already, about 150 hybrids have been secured between them.—*Meehan's Monthly* for May.

PLANT FOOD.—The Supervising Committee of the Experiment Farm, at Southern Pines, N. C., have just issued a very valuable and important work on "Plant Food." The book is well printed and handsomely illustrated with many fine pictures. It would pay cultivators to read this book, which we understand, can be obtained free by sending to the Director, Experiment Farm, Southern Pines, N. C.—*Meehan's Monthly*, May, 1899.

THE PASTEUR MONUMENT AT LILLE was unveiled a few weeks ago by the French Minister of Agriculture, M. Viger, with due ceremony. The monument has been paid for by public subscription, and is placed on the Place Philippe le Bon, at Lille. It is noteworthy that a Pasteur Institute was opened at the same time.

SULPHUR IN CALIFORNIA.—A discovery of sulphur was recently made in San Diego County, Cal., which is likely to prove of great importance. The vein, which is nine feet deep is said to be 90 per cent. sulphur and about the purest natural sulphur in the world. The claims are located on a spur of the far east point of the Laguna Mountains and have been bought by the United States Government.—*Omaha Druggist*, Vol. XII, No. 2.

RHUS AROMATICA AS A REMEDY FOR ENURESIS IN CHILDREN.—In a recent issue of *Treatment*, Freyberger sums up his observations on the use of Rhus aromatica, in thirty cases of enuresis. The treatment was very successful, and while experience with the drug has been too limited to rank it as a specific for this disease, it may be said that it appears to be as efficacious as belladonna, that it may be given for a long time without the slightest ill effect, and that good results may be obtained with it when belladonna p roves ineffective.—*Pediatrics*, January 1, 1899.

IMPROVING THE AIR IN WORKROOMS.—To one liter bottle of well water, add a spoonful of oil of turpentine, shake the liquid diligently until it becomes dim or white and distribute in the room, by means of an atomizer. One may also mix a few drops of acetic ether with the oil of turpentine. The refreshing effect of the quickly spreading, pleasant odor is astonishing.—*Kraft und Licht* through *Scientific American*, 1898, p. 394.

SPECIFIC AGAINST SEASICKNESS.—Bright red spectacles accompanied by internal doses of calomel, form a new German specific against seasickness. It is deduced from Epstein's investigations on the influences of color on the blood-vessels in the brain. Seasickness is due to lack of blood in the brain, while red sends blood to the brain with a rush. By looking at one point for some time through the red glasses, the patient is cured radically.—*Ibid.*, p. 394.

A METHOD FOR THE STORAGE OF EGGS, which was recently tried at Leith, is given in the issue of the *Scientific American* for January 21. The eggs are sealed in a storage apparatus which keeps them cool, and at the same time the arrangements are such that each egg has free access of air. The eggs are kept in an upright position, and are turned periodically so that the yolks are constantly imbedded in the albumen. This is accomplished by placing the eggs in frames, which by the action of a lever, can be inclined in different directions as needed.

CURIOUS ESCAPE FROM POISONING.—M. Cappelle, a pharmacist, at Tourcoing, and his family had a narrow escape a few days ago, but were saved by a happy hazard. The pharmacist's sister, Mlle. Cappelle, put some haricot beans to soak over night in an enamelled pan, and the next day cooked them in an iron saucepan. When the beans were served at table it was noticed that there were small globules of metallic mercury on the plates. The dish was put aside, and it is supposed that a criminal hand had poured corrosive sublimate on the beans while they were soaking. If they had been cooked in the enamelled pan, the whole family would probably have been poisoned, but the bichloride, by coming into contact with the iron saucepan, was decomposed, yielding the globules which attracted attention. The pharmacist's porter has been arrested on suspicion of the attempted crime, as he alone had the keys of the poison cupboard.—*Chem. and Drug.*

NOTES AND NEWS.

Mr. A. C. Wootton, who has been editor of the *Chemist and Druggist* for over thirty years, tendered his resignation of that office on the 29th of June. This was in accordance with his decision expressed over two years ago. As stated by the proprietors, he leaves with the esteem and regret of themselves and his other associates.

Philadelphia Association of Retail Druggists.—The regular monthly meeting was held on Friday, July 7th, with President Wm. McIntyre in the chair. The names of thirty-eight new members were reported. In addition to the other business transacted, E. J. Finnerty, Jr., was elected a delegate to the National Convention at Cincinnati, in October. The Association is pushing the work of securing members, and an application blank and reading matter may be had by addressing the Secretary, W. A. Rumsey, 920 North Forty-first Street.

Franklin Institute's Anniversary.—An interesting feature of the Exposition will be the formal celebration of the seventy-fifth anniversary of the Franklin Institute, which will extend through one week. To each section has been assigned a day which will be devoted to illustrating the advances made in the special work which this section represents—that is, one day to chemistry, one day to electricity, one day to mining and metallurgy, one day to photography and microscopy, and one day to mechanics.—*Bulletin of the National Export Exposition*, Philadelphia.

A Useful Present.—W. R. Warner & Co., of Philadelphia, New York and Chicago, are distributing free to doctors and druggists a very complete list of drugs, giving apothecary and metric doses. They are arranged in convenient columns and printed on coated linen cloth, size 22 x 14, for hanging at the prescription counter or in the doctor's office for ready reference. It will be sent to any doctor or druggist upon request. Drop them a postal for it.

Of Interest to Pharmacists.—Messrs. Merck & Co. announced on July 1st that after that date the Merck Pharmacy would no longer serve the public nor the medical profession on prescription orders, nor on calls for supplies of any sort; and that all orders of this character must hereafter come from established pharmacists.

Excursion of Parke, Davis & Co.'s Employees.—An enjoyable time was spent by the employees of this firm on Saturday, June 24th, on an excursion on the Detroit River, and at Tashmoo Park, this being the occasion of their ninth annual special holiday. The excursionists numbered 1,800 people, and according to the *Detroit Free Press*, constituted the largest picnic party which ever went out of Detroit.

Heroin and Heroin Hydrochloride.—Dr. Goldmann, of Berlin ("Allg. Med. Central-Zeitung," No. 33, 1899), in an interesting review of the therapeutics of these remedies, states that heroin, owing to its difficulty of solution in water, is chiefly adapted for administration in powders or pills, while for administration in drops and mixtures, and especially for subcutaneous use, its water-soluble salt, heroin hydrochloride, is

particularly suitable. In preparing solutions of the latter the presence of alkalies, as for example bicarbonate of sodium, liquor ammoniæ and the like, should be avoided, as otherwise a precipitation of heroin occurs. For making solutions of heroin hydrochloride for hypodermatic use the water should be previously sterilized and allowed to partially cool before addition of the drug.

From the clinical reports thus far published (Professors Eulenburg and Leo, Drs. Manges, Freudenthal, Strube, etc.) it would appear that the dose of heroin and heroin hydrochloride in adults varies from $\frac{1}{24}$ to $\frac{1}{8}$ grain for internal administration, while for hypodermatic use it is recommended to begin with a minimum dose ($\frac{1}{24}$ grain), which is gradually increased if necessary.

THE GLUCOSIDE OF CASCARA SAGRADA.—In a monograph on "The History, Pharmacognosy and Chemistry of Cascara Sagrada" the authors, Alfred R. L. Dohme and Hermann Engelhardt, describe the method whereby they succeeded in isolating a glucoside of the drug. They have named the principle purshianin. It is analogous to frangulin, the glucoside of Buckthorn, in that it yields emodin on saponification. It is further described as a dark brown-red crystalline substance, melting at 237° C., and also as being soluble in alcohol, ethyl acetate, acetone, alkalies and hot water. The authors intend to continue their investigations so as to show wherein purshianin differs from frangulin, or to establish the identity of these glucosides.

HYALODENDRON NAVALIUM, a new genus and species of euplectellid sponge.—This plant is described by J. Percy Moore (Proceedings of the Academy of Natural Sciences, 1898), and the following statement concerning its occurrence accompanies the description: The type of this genus and species is one of a small collection of silicious sponges gathered in Japan in 1893, by Mr. Frederick Stearns, of Detroit, Mich., and sent to the Academy of Natural Sciences of Philadelphia, for determination. They were collected by native fishermen and brought into Yokohama harbor by the dredge boats. The single specimen of *Hyalodendron* is the only one which had been reported by the fishermen. Other than this, no data relating to the collection are available. The specimens are accompanied by a set of sketches by a native artist.

REACTION FOR VANILLIN.—A very characteristic reaction for vanillin, according to Welmans, is the following: 0·1 gramme of vanillin is dissolved in 2 c.c. concentrated H_2SO_4, to which 0·1 gramme of α-naphthol is added. Upon agitation there develops a very characteristic bluish-red coloration. If one employs instead 0·1 gramme β-naphthol, there results an emerald green color changing to a yellowish-red.—*Chem. Zeit.*, 1898, p. 248; from *Pharm. Zeit.*, 1898, 634.

FORMIC ACID OF ANTS.—C. Janet (*Compt. rend.*, cxxvii, 130) has ascertained that in the region of the mouth, ants secrete an alkaline liquid. From the glands in the abdominal region formic acid is secreted, which is secreted only when the ants are in the act of flight. The latter is neutralized by the former, which is secreted by the ants when undisturbed, and is considered to furnish an "autointoxikation."—*Sudd.-Apoth.-Zeit.*, 1898, 622.

ALGAL FLORA OF THE HAMBURG WATER WORKS.—In a work on this subject, Herr O. Strohmeyer states that the green algæ—Cladophora, Spirogyra, Enteromorpha, Stichococcus, etc.—have a very powerful effect in purifying water

by the destruction of bacteria through the agency of the oxygen which they exhale. Those algæ, on the other hand, which are inclosed in a mucilaginous sheath, especially diatoms, have a very prejudicial effect on drinking water by stopping the filters through which it passes.—*Scientific American*, Vol. LXXIX, No. 13, p. 194.

IGNORANCE AND INFANT MORTALITY furnishes the subject of an editorial, in the issue of *Pediatrics*, for January 15th, which should find its way into lay publications. Reference was made to a "Howard Medal Prize Essay," by Hugh R. Jones, in which he stated that diarrhœa is exceedingly fatal during the first year of life—more especially during the earlier months. This fatality, in great measure is due to the improper feeding of infants. Owing to the neglect and ignorance of mothers the infants are fed on contaminated milk or other food. Among the data presented by Dr. Jones was a table, from a report of the sanitary condition of Boston in 1875, which showed that in the New England and the Middle States the infant mortality from cholera infantum and diarrhœa was in proportion to the illiteracy. Dr. Vernon, Medical Officer of Health for Southport, England, was quoted as saying: "My belief is that all the principal causes of infantile mortality are mostly results of ignorance—ignorance of the modes of spreading and means of restricting dangerous diseases; ignorance of the practical application of bacteriology and mycology to every-day affairs, particularly to food, water and food materials, on which human existence depends; ignorance of the effects of exposure of children to the ordinary atmospheric conditions; ignorance of that sort of knowledge which Herbert Spencer characterized as of 'most worth'—knowledge which tends to directly preserve life; knowledge which it should be the function of the public school system to make paramount 'because the life of the people is the supreme law.'"

TEA AND RHEUMATISM.—The habitual use of tea as a means of relieving headache is without doubt an efficient cause of rheumatism in numerous ways. The writer has met many persons who could not forego the morning cup of tea or coffee without suffering severely from headache and depression during the day. Haig has shown that a dose of uric acid will cure a headache, by driving the uric acid out of the blood. The day following, however, the reverse condition exists. The amount of uric acid found in the blood is increased, and a new dose must be given to protect the nervous system from the result of the contact of this nerve poison. The thein or caffein of tea has precisely the same effect as uric acid, and hence has come to be a favorite domestic remedy for headache. When used habitually, however, as will readily appear, the effect must be to cause a storing up in the body of uric acid and urates, thus laying the foundation for chronic rheumatism and the various allied conditions which have their foundation in the so-called uric acid diathesis or lithemia.—Editorial in *Good Health*.

TESTING SPIRITS OF TURPENTINE.—C. B. Dudley and F. N. Pease (Abs. in *Jour. Amer. Chem. Soc.*, 1898, p. 61) employ four tests: Specific gravity, distillation-point, residue on evaporation, and treatment with oil of vitriol. The gravity is determined by the Westphal balance, and varies from 0·862 to 0·872. The distillation-point is determined by boiling 100 c.c. in a 500 c.c. distillation flask. This point varies from 305° to 308° F. (152°–153° C.) and 29 inches

pressure, with the thermometer wholly in the vapor. For the residue on evaporation, 20 grammes of the sample are weighed into a 100 c.c. platinum dish and evaporated not above 250° F. (121° C.). The residue should not exceed 2 per cent. and usually does not exceed 1. The evaporation should take place at 105° C. in cases of dispute. The treatment with oil of vitriol is based upon the fact that pure oil of turpentine is almost wholly polymerized and dissolved by sulphuric acid. Six c.c. of the sample are placed in a 30 c.c. tube, graduated to tenths, held under a cold-water faucet and slowly filled with C.P. sulphuric acid. It is allowed to cool, the tube corked and the contents mixed five or six times, cooling, if necessary. The tube is placed vertically and allowed to stand half an hour. The material unaffected by the acid is the adulterant and its volume is measured. It is not usually more than 3 per cent.

POWDERED DRUGS.—The following table, taken from the *Helfenberger Annalen*, 1897 (*Pharm. Zeit.*, 1898, 319), gives the maximum size of the particles, in microns, and the amount of water contained in the same :

Substance.	Maximum Size in Microns.	Per Cent. of Water.
Cantharides	243·00	5·00–15·00
Flor. Chrysanthemi	255·00	5·55–13·95
Fol. Sennæ (Alex.)	234·00	9·20–16·50
Fol. Sennæ (Tinevelli)	164·00	4·20–14·50
Herb. Belladonnæ	145·80	6·50–12·25
" Conii	133·65	6·20–14·95
" Digitalis	147·15	3·80–13·57
" Hyoscyami	148·50	5·83–10·45
" Meliloti	155·25	6·25–13·55
Rad. Althææ	162·00	5·15–12·65
" Glycyrrhizæ (Sp.) / " " (Rus.)	229·50	3·90–13·50
" Rhei I / " " II	275·40	4·45–12·00
Sem. Fœniculi	184·95	9·95–13·55

THE STRUCTURE OF PROTOPLASM.—Dr. E. B. Wilson has made a critical study of the living protoplasm and finds (*Science*, July 14, 1899) that in the Echinoderm-eggs it is a mixture of liquids, in the form of a fine emulsion consisting of a continuous substance in which are suspended drops of two general orders of magnitude and of different chemical nature, as indicated by their staining reactions. He further considers that the astral rays in Echinoderms grow by progressive differentiation out of the general cytoplasmic meshwork, and that there is no ground, in the Echinoderm-egg, at least, for the recognition of a specific "archoplasm" or "kynoplasm" from which they arise. The entire coarser alveolar structure, *i. e.*, the foam structure of Bütschli, is in the eggs of secondary origin. He agrees with Kölliker that no universal or even general formula for protoplasmic structure may be given.

NOTES AND NEWS.

DR. A. R. L. DOHME has been elected President of the Maryland State Pharmaceutical Association.

PROF. ROBERT BUNSEN, the distinguished chemist and physicist, died at Heidelberg, Germany, on August 16th, in the 89th year of his age. An appropriate notice of his life and scientific work will appear in a later issue of this JOURNAL.

MR. E. M. HOLMES, F.L.S., curator to the museum of the Pharmaceutical Society (London), has been elected President of the British Pharmaceutical Conference for next year. Mr. Holmes is considered to be one of the greatest of living authorities upon the subject of materia medica, and it was in recognition of the value of his work in connection with this subject that he was awarded the first Flückiger medal in 1897 by the German *Apotheker Vereins.*

THE HANBURY MEDAL for 1899 has been awarded to Prof. Albert Ladenburg, Ph.D., M.D., now of Breslau, but formerly Professor of Chemistry and Director of the Chemical Laboratories of the University of Keil. Since the establishment of the memorial in honor of the late Daniel Hanbury for his distinguished services in promoting a knowledge of the natural history of drugs, it has been customary to award a gold medal biennially for this and other investigations relating to drugs. On the present occasion the adjudicators were Dr. Günther, President of the Linnean Society; Dr. T. E. Thorpe, President of the Chemical Society; Mr. William Martindale, President of the Pharmaceutical Society of Great Britain; Mr. J. C. C. Payne, President of the British Pharmaceutical Conference, and Mr. Francis Ransom. Professor Ladenburg's work lies principally within the domain of organic chemistry, his most notable researches having been on the constitution and synthesis of the alkaloids. Following are the names of those who have previously received the medal: Friedrich August Flückiger, 1881; John Eliot Howard, 1883; Georg Dragendorff, 1885; William Dymock, 1887; Gustave Planchon, 1889; Julius Oswald Hesse, 1891; Johann Michael Maisch, 1893; August E. Vogl, 1895, and John Elishu De Vrij, 1897.

The August *Coming Age* contains a paper of great interest by Prof. A. E. Dolbear, the well-known physicist. It is entitled "The Kind of Universe We Live In," and discusses in a brilliant manner the results of discoveries made through the telescope, spectroscope and microscope.

WARNER'S POCKET MEDICAL DICTIONARY has been carefully revised, and will be sent to any address upon receipt of 75 cents, in stamps or money order. Address W. R. Warner & Co., Philadelphia.

EXPOSITION OFFICIAL CATALOGUE.—The first edition of the Official Catalogue of the National Export Exposition, to be held in Philadelphia this fall will be issued about September 10th.

It will be a book 5¾ x 8¼ inches, with about 160 pages, and will contain the following information:

A plan of the grounds and buildings of the Exposition.

Photographs of its principal officers.

Photographs of the buildings.

A description of the buildings.

A list of the officers of the Exposition and of the commissioners accredited thereto.

A list of the committees of the Exposition.

A key to the system of installation (about one-half page).

Ground floor plans of the several buildings.

Classification of each group.

A sketch of the Commercial Museum.

A sketch of the Franklin Institute.

In the Catalogue proper will appear a list of exhibits with the name of the exhibitor, carefully arranged in groups, and groups and exhibits serially numbered. A terse description of each exhibit, calling attention to its important feature, is also permitted to follow the auditing of each exhibit. This Catalogue will be replete with interesting and valuable information, and will serve not only as a guide to visitors at the Exposition, but is sure to be preserved as a book of reference.

CHICAGO VETERAN DRUGGISTS' ASSOCIATION.—One of the objects of the Chicago Veteran Druggists' Association, aside from its social features, is the collection and compilation of a historical record of Pharmacy of early Chicago, and its preservation for the future by committing it to the care of some institution like that of the Historical Society of Chicago. To accomplish this object and to have it historically correct will require the aid and co-operation of those who possess a recollection of the Drug Trade of Chicago prior to the big fire in 1871.

Information concerning the organization and its plan of work may be had by addressing the historian, Albert E. Ebert, 426 State Street, Chicago.

ALUMNI ASSOCIATION OF THE CINCINNATI COLLEGE OF PHARMACY.—At the annual meeting of the Association, held recently, the following officers were elected for the ensuing year: President, Prof. Charles Apmeyer; First Vice-President, Prof. Charles W. Ford; Second Vice-President, Miss Marie Kusnick; Secretary, John Weik; Treasurer, Prof. Charles T. P. Fennel; Corresponding Secretary, Louis Klayer; Executive Committee, Prof. Louis W. Sauer, Dr. Otto Dickmann, Ralph Freiberg and George Theobald; Entertainment Committee, Louis Klayer, B. Fries and Miss Marcella Feth; Managers of the *Alumni Journal*, Profs. Charles T. P. Fennel and Julius Eichberg; Auditing Committee, Joseph Koenig, R. Freiberg and Prof. Louis W. Sauer.

The Association has a membership of 540, and is the third largest of its kind in the United States.

A UNIVERSAL LANGUAGE FOR MEN OF SCIENCE.—At a recent meeting of the Prussian Academy of Sciences, Professor Dills spoke of the need of a universal language for men of science. He considers Volapük an artificial product of little use. English is his choice as the world-language, because of its wide prevalence, and because its simple structure and grammar make it eminently suitable for such use.—*Medical News.*

THE RECENT GRADUATE is theoretically, as a rule, ahead; practically, the man of some years' experience is ahead. Experience and knowledge of medicine are not synonymous. Experience indicates that a practitioner is a good judge of human nature, rather than that he possesses a broad knowledge of medicine.—*The Eclec. Med. Jour.*, 1898, p. 597; from *S. W. Med. and Surg. Rep.*

NOTES AND NEWS.

THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS held its second annual meeting in Cincinnati from October 3 to 6, 1899. There were a large number of delegates present, and the earnestness, sincerity and enthusiasm with which the members went at their work was very gratifying, and speaks well for the future of the organization. The Philadelphia Association of Retail Druggists was represented by Wm. McIntyre, James C. Perry, W. H. Foley, E. J. Finnerty and W. A. Rumsey. The address of the President, H. P. Hynson, Baltimore, Md., was appropriate and characterized by good sense and an appreciation of existing conditions. The report of the Secretary, Thomas V. Wooten, showed that an immense amount of work had been done towards arousing the entire retail trade of the country to the necessity for organization and representation in the N. A. R. D. Not only was the report of the Secretary encouraging in this direction, but it was further shown that the various State pharmaceutical associations were in sympathy with the organization, and that the work of the various pharmaceutical journals in giving the widest publicity to the work of the Association was much appreciated.

In the report of the Committee on Education and Legislation, Mr. W. C. Anderson, Brooklyn, urged the Association to coöperate with the American Pharmaceutical Association in securing uniformity in educational matters and pharmacy laws. Mr. Frank E. Holliday, Chairman of the Executive Committee, made a most encouraging report, in that 90 per cent. of the members of the Proprietary Association were now limiting the distribution of their goods according to the resolution requiring proprietary manufacturers to limit their sales to certain distributors approved by the Proprietary Goods Committee of the N. W. D. A., the Proprietary Association and the Executive Committee of the N. A. R. D. The report of the Treasurer, John W. Lowe, showed a balance of $544.17. The Nominating Committee reported the following names of members for the respective offices, who were duly elected :

President, Simon N. Jones, Louisville, Ky.; Vice-Presidents, Wm. C. Anderson, Brooklyn, N. Y.; Thos. Layton, St. Louis, Mo.; Alex. M. Robinson, Bangor, Me.; Secretary, Thos. V. Wooten, of Chicago; Treasurer, Chas. T. Heller, St. Paul, Minn. Executive Committee: F. E. Holliday, Topeka, Kan.; H. P. Hynson, Baltimore, Md.; J. W. Cheswright, Pittsburg, Pa.; D. E. Prall, Saginaw, Mich.; A. Timberlake, Indianapolis, Ind.; Alfred De Lang, Cincinnati, O.

The Association has wisely strengthened its position taken last year, and is deliberating upon its proceedings to such an extent that no one concerned, either directly or indirectly, in the work of the N. A. R. D. can feel other than confident that the members are laboring in a just cause, and that the methods pursued will be wise, honorable and effective.

THE PHARMACIST OF THE "OLYMPIA"—Dewey's pharmacist, Alrik Hammar, was the recipient of a loving cup from the pharmacists of New York at a banquet held in New York City, on September 30th, at which nearly 200 pharmacists were present. A number of addresses were made by representative pharmacists of New York City and vicinity. Prof. H. H. Rusby presented the loving cup in behalf of the pharmacists of New York City and vicinity. Mr. Hammar, in accepting the cup, responded in a few modest but appropriate words.

SEVENTY-FIFTH ANNIVERSARY OF FRANKLIN INSTITUTE.—A series of meetings celebrating the seventy-fifth anniversary of the founding of the Franklin Institute were held in the Convention Hall of the National Export Exposition during the week beginning October 2d. The more exact time for holding this celebration would have been in February last, but, owing to the Institute's part in carrying forward arrangements for the Exposition, it was deemed more appropriate to hold it at the time named.

The first five days of the week were devoted to the several sections of the Institute in the order of their seniority, the exercises of the sixth day being such as pertained generally to the work of the Institute.

The opening meeting of the series was that of the Chemical Section. President John Birkinbine, of the Institute, made an address previous to the exercises proper of the Section, and Dr. W. P. Wilson welcomed the members on behalf of the Exposition. An introductory address was then made by Dr. Joseph Richards, President of the Section, which was followed by an address by Harvey W. Wiley, of Washington, D. C., upon the "Progress of Chemistry as Applied to the Arts," and an essay by Charles F. Himes, Carlisle, Pa., upon "Photography and Microscopy in their Application to the Arts."

Tuesday was devoted to the Electrical Section, and the first address was made by the President of the Section, Prof. George J. Hoadley, followed by an address by Dr. Edwin J. Houston, upon "The Seventy-fifth Anniversary of the Franklin Institute from an Electrical Standpoint;" and an address by Mr. Ralph W. Pope, of New York, upon "The Influence of Such Societies as the Franklin Institute and the American Institute of Electrical Engineers in Promoting the Progress of the Electrical Arts."

On Wednesday, Mr. James Christie, of Philadelphia, President of the Mining and Metallurgical Section, delivered the introductory address, followed by Mr. Charles Kirchhoff, of New York, on "Three-quarters of a Century's Progress in Mining and Metallurgy," and by Mr. John Fritz, Bethlehem, Pa., on "The Development of Iron Manufacture During the Last Three-quarters of a Century."

Thursday the exercises of the Mechanical and Engineering Section were held, and consisted of an address by the President of the Section, Mr. Wilfred Lewis, Philadelphia, and an address by Dr. Coleman Sellers, Philadelphia, on "The Progress of the Mechanical Arts in Three-quarters of a Century."

The exercises of the Physical and Astronomical Section on Friday consisted of an introductory address by the President of the Section, Dr. A. E. Kennelly, of Philadelphia, and an address by Dr. T. C. Mendenhall, Worcester, Mass., on "The Progress of Physics and Astronomy."

The proceedings on Saturday were given to a general celebration of the anniversary, and the day was known as "Institute Day." The President of the Institute, Mr. John Birkinbine, presided, and made an address reviewing the history of the Institute and its achievements in promoting science and the advancement of the industrial arts. Rear-Admiral George W. Melville, Engineer-in-Chief of the United States Navy, delivered an instructive address upon "The Warship as Combining in Itself the Highest Results of Skill, Ingenuity and Scientific Knowledge." Robert H. Thurston, ex-President of Cornell University, read an interesting essay on "The Evolution of Technical Educatin and Its Progress During the Past Seventy-five Years."

POISON SUMAC.—*Rhus vernix*, L., [also known as swamp sumac, dogwood (Massachusetts), poison dogwood, poison elder (Alabama), poison ash (Vermont), poison tree, poison wood, poison swamp sumac, thunderwood (Georgia and Virginia)] is a shrub from 6 to 30 feet high, with long pinnate leaves, having from 7 to 13 leaflets. The wood has a faint sulphurous odor, which, together with the leaf scars, which are very prominent, enables one to distinguish the plant from other shrubbery in winter. It grows in swamps and damp woods from Canada to Florida and westward to Louisiana.

The effects of the poison are the same as that of poison ivy, and cases require the same remedy. Evidently the active principle is an oil similar to that isolated by Pfaff from *Rhus radicans*, L. It is highly desirable that legal measures be adopted compelling the destruction of these plants where they abound in cities and in places of popular resort. This can be managed without much danger from the poison, and is a matter of very general public interest. Owing to the fact that many individuals are practically immune from the effects of poison ivy, advantage should be taken of this fact to employ such individuals to remove these plants from the vicinity of dwellings and from playgrounds. Much of the work would be purely mechanical, consisting in rooting the plants up by main force. This is the most certain method; the use of concentrated sulphuric acid is attended with less danger, as the plants do not need to be touched. A half teaspoonful should be applied to the stem every two or three weeks in the spring time when the plant is growing most vigorously. Care should be taken to keep the acid away from the skin, as it is most highly corrosive. The brush should in no case be left upon the ground nor the wood used for fuel. In burning the refuse in the field, pains should be taken not to inhale the smoke nor to handle the wood any more than necessary.

The greatest care should be exercised in preventing workmen from trans-

ferring the oil from their clothes and hands to other individuals. To accomplish this object special suits should be worn, and the hands should be washed several times a day with an alcoholic sugar of lead solution (alcohol (50 or 75 per cent.) nearly saturated with sugar of lead). Bathing in hot water with strong soap-suds is recommended. The clothing must also be well washed, and it is always well to remember that towels may be a means of conveying the oil.—Bull. No. 20, U. S. Depart. of Agric., Division of Botany.

JEFFERSON MEDICAL COLLEGE.—The exercises at the formal opening of the new Medical Hall, Jefferson Medical College, were attended by an enthusiastic assemblage. Dr. Thomas A. Emmet, a distinguished graduate of 1851, presided. The address of the evening was delivered by Phineas S. Conner, Professor of Surgery in the Ohio Medical College. Following Dr. Conner, Surgeon-General George M. Sternberg, U. S. A., made a short address. Before the exercises a banquet was given by Hon. William Potter to the members of the Faculty, Board of Trustees and to the guests of the evening.

A MEMORIAL TO DR. MUELLER.—It is reported that a memorial to Dr. Mueller, who lost his life while studying the plague a year ago in Vienna, is about to be unveiled.—*Boston Med. and Surg. Rep.*, 1899, p. 351.

NO RIGHT TO TERMINATE LIFE.—The question of whether or not the physician ever has the right to terminate life, either that of a patient hopelessly ill and suffering intense agony, or that of a newly-born monstrosity, has been very interestingly discussed, from an ethical rather than from a legal standpoint, before the Medico-Legal Society. Legally speaking, no such right exists.—*N. Y. Med. Jour.*, 1899, p. 529.

THE MOTH-BALL AND MOSQUITOES.—A moth-ball rubbed upon a mosquito bite has considerable efficacy in allaying the itching. Moreover, when rubbed upon the face and hands it seems to keep the mosquitoes away.—*Ibid.*, p. 533.

A FERTILE HYBRID PIGEON.—C. O. Whitman, of the University of Chicago, is reported to have succeeded in raising a fertile hybrid pigeon. This means the making of an entirely new species of pigeons, and is a scientific achievement which has been supposed impossible. The mother of the hybrid bird was a Japanese turtle dove, and the father a common rough pigeon.—*Med. News*, 1899, p. 468.

DANGEROUS FLOWERS.—M. Domingos Freire (*Journal de médécine de Paris*, September 3d), as a result of researches instituted by him on flowers, shows that flowers can afford a resting place to saprophytic and pathogenic microbes, and thus become a source of contamination. He thinks, moreover, that some relation exists between the colors of flowers and the pigment elaborated by the microbes which find shelter in them. The rosy tint of the Rothschild rose is similar to that of a plate culture of *Leptothrix ochracea* before it arrives at the brick-red stage. The egg-yolk yellow colonies of *Micrococcus cruciformis* he finds to be of the same tint as that of the coloring matter on the anthers of the *Hibiscus rosa sinensis* Furthermore, many kinds of microbes that the author would term "osmogenous" reproduce odors resembling those disengaged by the essences of the plants in which they live.—*N. Y. Med. Jour.*

NOTES AND NEWS.

AMERICAN PHARMACEUTICAL ASSOCIATION.—General Secretary Professor Charles Caspari, Jr., announces that "The Council, having been charged with fixing the date for the next annual meeting of the American Pharmaceutical Association, to be held at Richmond, Va., in 1900, has decided to name May 7 to 12, inclusive, as the time for holding the meeting."

THE PENNSYLVANIA STATE PHARMACEUTICAL EXAMINING BOARD will hold its next meeting in the Central High School Building, corner Broad and Green Streets, Philadelphia, on Saturday, January 20, 1900, between the hours of 12 and 5 P.M. Application blanks and all other information will be furnished by the Secretary, Charles T. George, Harrisburg, Pa.

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.—The office of the national secretary, Thos. V. Wooten, has been removed to the Association Building, 153–155 La Salle Street, Chicago. The secretary's office is the property of the national association and is at the command of its members whenever its services can be used. A cordial invitation is extended to the membership to visit the office when in Chicago. Each member of the N. A. R. D. should feel that he has a personal interest in the national headquarters and the work being done there for the advancement of the association's welfare.

PHILADELPHIA ASSOCIATION OF RETAIL DRUGGISTS.—At the regular meeting, on November 3d, J. C. Perry, Chairman Executive Committee, reported eight new members, and also that a Committee of Three, as follows: Wm. McIntyre, Jas. C. Perry and W. A. Rumsey, had been appointed to wait on the wholesale houses who conducted a retail counter and sold goods at retail. The Committee hope to have their report ready by the next meeting. President McIntyre, Chairman, gave a report of the delegates' trip to Cincinnati. The next meeting will be held Friday, December 1st, at the Philadelphia College of Pharmacy, at 3 P.M. This will be the first annual meeting, and officers will be elected to serve for the ensuing year.

PROF. JOHN URI LLOYD has arranged with Dodd, Mead & Co. for the publication of his book "Stringtown on the Pike." This work promises to be even more original and unique than "Etidorhpa," and will be welcome news, particularly to the members of the American Pharmaceutical Association, who heard some selections from it at the meeting at Put-in-Bay.

A LEGAL DECISION ON SUBSTITUTION.—A decision of considerable importance was made by Judge Kohlsaat in the United States Circuit Court at Chicago, on October 13, 1899. In a bill for an injunction, Fairchild Brothers & Foster, of New York, had charged a Chicago druggist with substituting a spurious and inferior preparation for "Fairchild's Essence of Pepsine," in several cases where the latter was expressly called for in physicians' prescriptions. Judge Kohlsaat's decree sustains the charges made, perpetually enjoins the druggist from ever repeating the offense and taxes him with the costs, amounting to about $500. "This is said to be the first contested case in the United States in which the principle of protection to trade-marks and trade names was extended so as to apply to what is technically known in the drug business as 'substitution.' Judge Kohlsaat's decision will probably protect manufacturing chemists, physi-

cians and the general public, all of whom have in the past suffered from these fraudulent practices of a certain class of druggists."

In this connection we would refer to an editorial in this JOURNAL in April, 1897, in which the opinion was given that a pharmacist "has no right to substitute his own or anybody else's preparation for the one specified, even if he is sure that the substitute is as good or as he may think better."

PERFECTION IN MECHANICS.—Thomas S. Wiegand, in speaking of a recent visit which he made to the Philadelphia Mint, said that he was shown a wonderful assay balance, recently constructed for the use of the chief assayer, by Henry Troemner, of Philadelphia, which is a triumph of the scale maker's art. It easily indicates the one two-hundredth part of a milligramme. This, if stated in Troy weight, would equal about the one thirteen-thousandth of a Troy grain, making it probably the most sensitive scale in America. Its general construction is of the highest order of mechanism. All the working parts are set with agate bearings; the beam is made of pure aluminum and colored a jet black, while the divisions and markings are filled with white enamel. This is done to relieve the eye in the reading of same, making that operation one of ease and comfort, as the reflection of any polish is thus totally obviated.

INJECTIONS OF PIPERAZIN (each consisting of 8 minims of distilled water and five-sixths of a grain of piperazin) have been successfully employed by Giofredi (*Gazetta degli Ospedali*, August 20, 1899) to remove a uratic deposit from the tendon-sheath of the peroneus longus. The author expresses the opinion that gouty joints might be as successfully treated in a similar way, if strict antiseptic precautions were used.—*Phil. Med. Journal*, October 28, 1899.

LIQUID AIR AS A DRINK.—M. D'Arsonval had offered a guest some liquid air mixed with champagne, and he, without waiting till the champagne thawed, swallowed the whole glassful, containing about 15 c.c. of liquid air. After a few moments, his stomach was acutely distended, but a sudden violent expulsion of food and gas relieved this condition.—*Scientific Amer.*, 1898, p. 218.

NITRATES IN PLANT TISSUES.—Berthelot has conceived the idea that plants have the power of producing nitrates in their own tissues. This assumption, if proved, would furnish an entirely new departure in vegetable physiology.—*Chem. and Drug.*, 1899, p. 678.

DETECTION OF CARAMEL IN SPIRITS AND VINEGAR.—C. A. Crampton and F. D. Simons (*Jour. Amer. Chem. Soc.*, 1899, p. 355) find that Fuller's earth may be used in detecting caramel in spirits and vinegar, owing to the fact that Fuller's earth removes a greater percentage of coloring from the artificially colored samples than from those naturally colored from the wooden containers.

DEFENSIVE REACTION OF THE ORGANISM.—Soulier attributes the agglutination reaction to the general plan of defense of the organism against infections and considers intravascular injections the promptest means to place the medicinal agent at once where it will most effectually sustain the elements of the organism in their struggle.—*Progres. Med.*, X, 30; *Jour. Am. Med. Assoc.*, 1899, p. 1183.

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Brief Notes

OF

Present Interest

Various substances are here referred to, and all possess a specific interest to the pharmacist. Some have a definite bearing on the dispensing counter. Some relate to the laboratory. And one—Creolin - Pearson—points the way to the field which the druggist occupies alone; that is, the selling of disinfectants.

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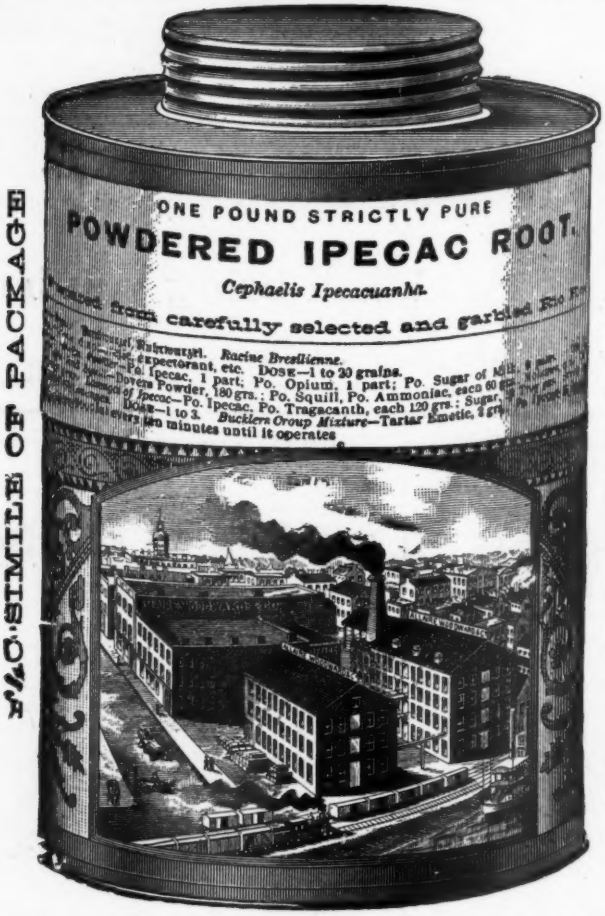
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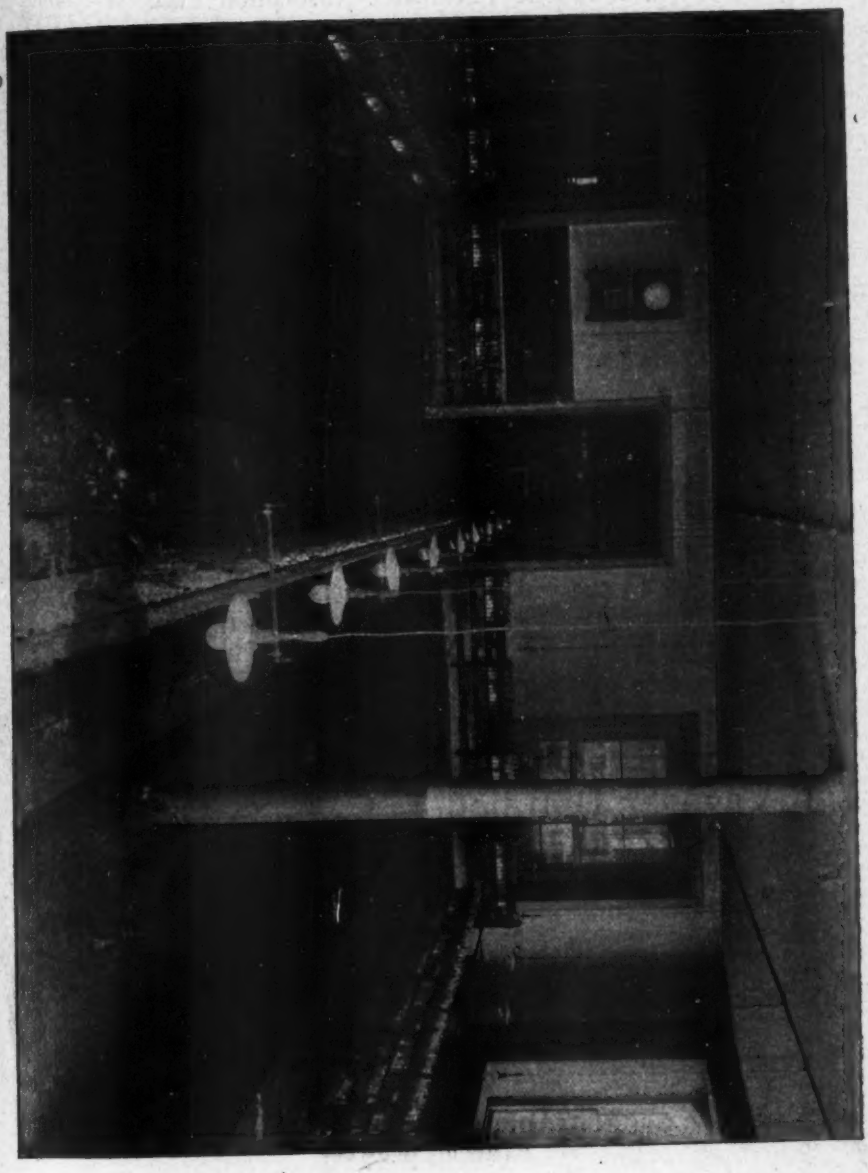

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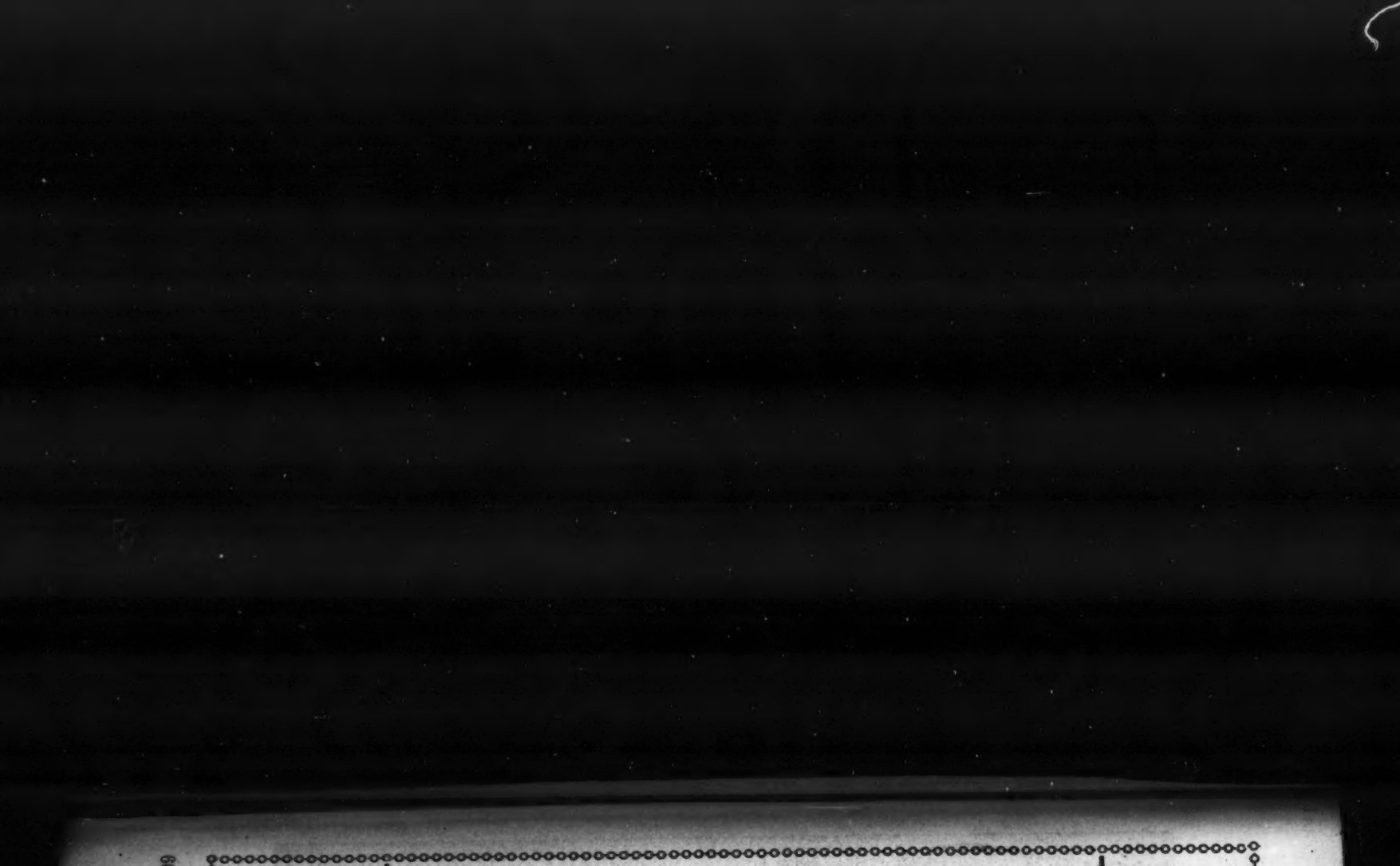

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